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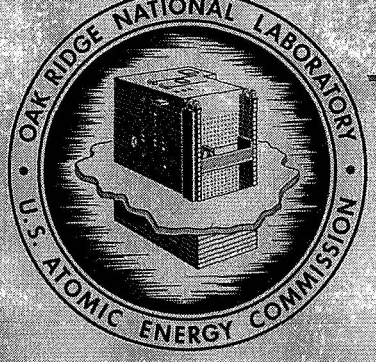

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ABSTRACT

Tabulated differential cross sections are presented for the production of proton, deuteron, triton, helium-3, and alpha particles from ^{27}Al bombarded by 62- and 29-MeV protons. At 62 MeV, continuum cross sections are listed at 18 angles from 12 deg through 160 deg, while at 29 MeV data are given at only three angles. The low-energy cutoffs on the spectra range from 3 to 6 MeV. Angular distributions are given for excitation by 62 MeV protons of states at 0, 2.2, 2.7, and 3.0 MeV in ^{27}Al, and at 0, 1.06, 2.07, and 4.7 MeV in ^{26}Al.

The differential cross sections for the production of proton, deuteron, triton, helium-3, and alpha particles produced by bombardment of targets by 62-, 39-, and 29-MeV protons were measured over a secondary energy range from ~3 to 62 MeV. The details of the experimental system and data analysis have been reported elsewhere.[1,2] This report gives the tabulated cross sections for the secondary charged particles from ^{27}Al bombardment by 61.5- and 28.8-MeV protons.

The incident protons were accelerated by the Oak Ridge Isochronous Cyclotron, momentum analyzed in a 153-deg magnet and focused on the target in a spot of approximately 8-mm diameter. The reaction particles from the target were detected in an all solid-state, three-counter telescope utilizing lithium-drifted germanium as the total absorption detector.[3] The overall energy resolution attained by the spectrometer was approximately 180 keV (FWHM) for most of the data reported here. The secondary-particle type was determined by a combination of ΔE vs E and flight time vs E methods which permitted unambiguous identification over the whole reported energy range. Data were obtained from four ADC's for each event, processed in an on-line PDP-8 computer, and written on magnetic tape. The data were analyzed on the ORNL IBM-360 and CDC-1604 computers and on the PDP-8.

Three aluminum targets were used and in each case the targets were commercially available aluminum foil. The thicknesses and nonuniformities of the three foils are listed in Table 1, along with experimental parameters and estimated uncertainties. The thickness of the target was the limiting factor for the low-energy cutoff of the alpha spectra while the other particle spectra were limited by experimental factors shown in Table 2. A list of the factors by which counts are multiplied to give millibarns $(\text{steradian})^{-1}$ (laboratory system) are given for each angle in Table 3.

The data tabulated in this report have been corrected for the effects of: nuclear reactions in the germanium detector, "dead" layer in the path of the scattered particles, multiple scattering of the secondary protons by the ΔE detectors, energy loss from the scattered particles in the target, the effective narrowing of the collimator aperture by the beam spot size and alignment, and collimator edge penetration by the scattered particles. These corrections are described in refs. 1 and 2.

The magnitudes of the "tail" corrections for nuclear reactions in the germanium detector and for collimator edge penetration are both dependent upon the number and spectral distribution of recorded counts. These corrections are significant only for protons at scattering angles less than about 30 deg, where the spectra are dominated by strong elastic scattering, and generally fall rapidly with angle within that range. The uncertainty in the correction for collimator penetration is taken as 20% of the correction, which is approximately proportional to pulse height. This uncertainty is significant only at 12 deg, as shown in the table below. The uncertainty in the reaction tail correction is taken as 25% of the correction, which rises from zero to its full value between 35 and 45 MeV and then remains roughly constant up to the elastic peak. The cross section uncertainty in the standard correction is tabulated below for the runs in which it is significant. These uncertainties must be combined with the overall uncertainties of Table 1 and with statistical uncertainties.

an apparent continuum (presumably consisting of many weakly excited and unresolved levels) was subtracted from the data. For example, in Fig. 1, a smooth continuum with magnitude varying from $\sim$ 1 to 0.5 mb/sr/MeV would be subtracted from the peaks between 50 and 55 MeV. Tables 4-7 give the elastic scattering cross sections and the differential cross sections for the 2.21-, 2.73-, and 3.03 MeV levels obtained from the ^{27}Al data. From the ^{27}Al(p,d)^{26}Al reaction the differential cross sections for the ground state (Q = -10.83 MeV), 1.06-, 2.07-, and 4.73-MeV levels in ^{26}Al were obtained. These cross sections are listed in Tables 8-11. The Q values given for the levels listed are those values obtained in the experiment and are uncertain by ± 0.02 MeV. The energies of the observed low lying levels are in good agreement with known levels. Although levels are seen in the triton and helium-3 plots, differential cross sections for the observed levels have not been extracted. It should be noted that the errors shown on the cross sections listed in Tables 4-11 and on other data tables to be discussed below are based on counting statistics only and must be used with the systematic uncertainties (5% overall) in Table 1.

Since data were obtained at only three angles for incident 28.8 MeV protons, differential cross sections for the peaks observed were not extracted. However, the elastic-scattering cross sections for the three angles are listed in Table 12. Integrals over angle are not presented in the report for 28.8-MeV protons due to the small number of data angles.

Table 13 is a list of the binned cross sections integrated over angle for each particle type, for 62-MeV incident protons, in units of millibarns/MeV, and the energy listed is for the lower edge of each bin. Table 14 shows the energy integrated laboratory cross sections at each angle in units of millibarns/steradian, and the average energies in MeV, for both 62- and 28.8-MeV incident protons. This table also lists the low-energy cutoff for each particle type at each angle. The total cross sections, in millibarns, average energies in MeV and average forward momenta in MeV/c, for the observed proton, deuteron, triton, helium-3, and alpha particles are listed in Table 15 for 62-MeV incident protons. The secondary proton cross sections listed in the tables do not include

Angle	Uncertainty from reaction tail correction at 45 MeV	Uncertainty from collimator edge penetration at 45 MeV
	62 MeV	
12 deg	± .45 mb (ster-MeV)$^{-1}$	± 0.09 mb (ster-MeV)$^{-1}$
15 deg	± .30	
30 deg	± .01	
	29 MeV	
11 deg	± .36	
30 deg	± .04	

A large amount of tail, uncompensated by the standard tail corrections, has been found in the 62-MeV, 25-deg data. Presumably it was caused by detector malalignment. To correct for the extra tail, 0.38 ± .25 mb(ster-MeV)$^{-1}$ was subtracted from the 25 deg proton data between energies of 45 and 62 MeV, and a decreasing amount was subtracted in the region between 35 and 45 MeV. The peak cross sections at 25 deg were correspondingly increased by 12% ± 8%. The uncertainties on these excess reaction tails have been included in the tabulated data.

Figures 1-10 show the proton, deuteron, triton, helium-3, and alpha spectra from aluminum at 30 deg for both 62- and 29-MeV incident protons. This data was taken using the thinnest of the aluminum targets, the only target thin enough to allow observation of the evaporation peak in the alpha spectrum.

The spectrum of protons, deuterons, tritons, and helium-3's at 62 MeV show the presence of a number of closely spaced peaks from excitation of levels in the residual nuclei. This is particularly the case for the inelastic proton spectrum where only a few of the many levels observed in Fig. 1 appear to be due primarily to excitation of a single state. Differential cross sections were obtained for those particle groups whose pulse-height resolution appeared consistent with that expected from a single level (150 to 200 keV) and which could be separated from nearby groups. In some cases, in order to obtain the peak cross sections,

the elastic scattering cross section, while the cross sections for the other secondary particles include all observed events.

Tables 16-20 list for each angle the laboratory cross sections for proton, deuteron, triton, helium-3, and alpha particle production from 62-MeV incident protons on ^{27}Al, binned in 0.4-MeV wide bins at low energies and 1-MeV wide bins elsewhere, in units of millibarns $(\text{steradian})^{-1}(\text{MeV})^{-1}$. The bin energies listed are the center of the bins. Tables 21-25 list the cross sections for the above particles produced by 28.8-MeV incident protons. Cross sections are listed for energies above the cutoffs listed in Table 14.

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REFERENCES

1. F. E. Bertrand et al., Differential Cross Sections for the Charged Particles Produced by 60-MeV Protons on Carbon, Iron, and Bismuth, ORNL-4274 (1968).

2. F. E. Bertrand and R. W. Peelle, Tabulated Cross Sections for the Hydrogen and Helium Particles Produced by 62-MeV Protons on ^{89}Y, ORNL-4450 (1969).

3. F. E. Bertrand et al., "A Total Absorption Detector for 60-MeV Protons Using Lithium-Drifted Germanium," Proceedings of Ninth Scintillation and Semi-Conductor Symposium, June, 1966, p. 279.

Table 1. Experimental Parameters and Uncertainties

^{27}Al Targets

62-MeV

Thicknesses	5.20 ± 0.052; 3.80 ± 0.038; 1.23 ± 0.012 mg/cm^2
Nonuniformities	± 1% ± 1% ± 1.5%

29-MeV

Thickness	1.23 ± 0.012 mg/cm^2
Nonuniformities	± 1.5%

Beam Energies

0100 runs	61.50 ± 0.1 MeV
2000 runs	61.89 ± 0.1 MeV
7000 runs	60.86 ± 0.1 MeV
0000 runs	28.81 ± 0.1 MeV

Collimators Used:

	Material	Thickness	Area(±1.5%)	Distance(±1
0100 runs	Ta	0.432 cm	0.522 cm^2	45.8
0000 runs	Ta	0.013 cm	0.522 cm^2	45.8
2000 runs	Ni	0.653 cm	0.183 cm^2	46.2
7000 runs	Ni	0.653 cm	0.265 cm^2	46.4

Detector Angle	± 0.5 deg
Zero Angle	± 0.5 deg
Angular Resolution	± 1.2 deg
Target Angle	± 0.5 deg
Beam Spot Diameter	0.8 cm
Beam Spot "Walk"	± 0.4 cm
Collimator misalignment at chamber center	± 0.5 cm
K (for Collimator Scattering Correction)	0100 - 2.2 0000 - 2.2 7000 - 3.2 2000 - 4.2
Uncertainty in various corrections to data	± 1%
Uncertainty in number of Protons striking target	± 1%
Uncertainty in dead time measurement	± 2%
Combined Absolute Uncertainty	● 5%

Table 2. ^{27}Al Low-Energy Data Cutoffs

Particle Type	Cutoff	Reason
	62 MeV	
Proton	2.8-3.4 MeV	TOF "fold over"
Deuteron	2.3-2.9 MeV	TOF "fold over"
Triton	6.2-6.6 MeV	Mass 3 ambiguity and target thickness
Helium-3	6.6 MeV	Mass 3 ambiguity and target thickness
	13.1 MeV	Lack of TOF data
Alpha	2.8-5.7 MeV	Target thickness
	14.5 MeV	Lack of TOF data
	29 MeV	
Proton	1.8 MeV	Target thickness
Deuteron	1.7 MeV	Target thickness
Triton	6.2 MeV	Mass-3 ambiguity
Helium-3	6.6 MeV	Mass-3 ambiguity
Alpha	2.5 MeV	Target thickness

Table 3. List of Angles, Run Numbers, and Factors

Lab Angle (deg)	Run Number	Factor[a]
	62 MeV	
12	0117	5.245(-3)[b]
15	0116	8.440(-3)
25	2047	1.253(-3)
30	7106	2.920(-4)
35	2004	5.557(-4)
40	2035	4.411(-4)
45	7101	2.522(-4)
50	2040	3.792(-4)
55	2043	3.748(-4)
60	0104	6.980(-4)
65	2046	3.604(-4)
70	2030	3.500(-4)
75	2021	1.310(-4)
82	2025	1.748(-4)
90	0110	3.502(-4)
110	0107	2.783(-4)
135	2065	2.369(-3)
160	2066	1.126(-3)
	28.8 MeV	
11	0033	1.496(-2)
30	0026	2.210(-3)
60	0034	9.598(-4)

a) Number by which counts are multiplied to give laboratory system millibarns/steradian.

b) read as 5.245×10^{-3}

Table 4. Tabulated Differential Cross Sections

$^{27}Al(p,p)^{27}Al$

E_p = 62 MeV

Elastic Scattering

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
12	12.5	2002.1	1858.0	0.1
15	15.6	1463.7	1358.8	0.2
20.8	21.6	334.1	310.8	0.5
25	25.9	136.62	127.32	0.8
30	31.0	49.26	37.67	0.2
35	36.3	26.82	25.17	0.4
40	41.5	22.74	21.52	0.4
45	46.5	21.63	20.47	0.3
50	51.6	6.71	6.39	0.7
55	56.7	2.98	2.85	1.1
60	61.9	2.33	2.25	1.7
65	66.9	1.49	1.44	1.5
70	72.1	1.05	1.03	1.8
75	77.1	0.523	0.513	1.6
82	84.1	0.221	0.229	2.8
90	92.3	0.136	0.136	5.1
110	117.2	0.046	0.047	8.0

Table 5. Tabulated Differential Cross Sections

$^{27}Al(p,p')^{27}Al$

E_p = 62 MeV

Q = -2.21 MeV

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	15.6	3.66	3.39	7.5
20.8	21.6	3.26	3.03	7.0
25	26.0	3.97	3.70	8.0
30	31.1	3.13	2.92	1.0
35	36.3	1.12	1.05	2.3
40	41.4	0.434	0.409	3.6
45	46.5	0.478	0.452	2.4
50	51.6	0.414	0.394	3.2
55	56.8	0.312	0.298	3.5
60	61.9	0.269	0.258	5.1
65	67.0	0.136	0.131	5.2
70	72.1	0.116	0.113	5.7
75	77.2	0.085	0.083	4.3
82	84.2	0.063	0.063	5.5
90	92.3	0.024	0.024	12.9
110	112.2	0.0075	0.0077	21.2

Table 6. Tabulated Differential Cross Sections

$^{27}Al(p,p')^{27}Al$

E_p = 62 MeV

Q = -2.73 MeV

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	15.6	2.40	2.22	11.6
25	26.0	1.04	0.97	8.0
30	31.1	0.40	0.374	4.5
35	36.3	0.377	0.353	5.1
40	41.5	0.235	0.222	5.8
45	46.5	0.164	0.155	4.8
50	51.6	0.143	0.140	5.6
55	56.8	0.103	0.099	6.8
60	61.9	0.091	0.088	9.2
65	67.0	0.042	0.040	10.3
70	72.1	0.026	0.025	14.5
75	77.2	0.023	0.022	8.3
82	84.2	0.012	0.012	16.0
90	92.3	0.0047	0.0047	33.5
110	112.2	0.0023	0.0023	37.0

Table 7. Tabulated Differential Cross Sections

$^{27}Al(p,p')^{27}Al$

E_p = 62 MeV

Q = -3.03 MeV

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	15.6	1.28	1.19	20.9
20.8	21.6	3.51	3.26	7.3
25	26.0	4.50	4.19	8.0
30	31.0	3.31	3.10	1.0
35	36.3	1.34	1.26	2.6
40	41.5	0.491	0.463	3.0
45	46.5	0.578	0.546	2.1
50	51.7	0.478	0.455	3.2
55	56.8	0.374	0.358	3.1
60	61.9	0.253	0.243	6.6
65	67.0	0.140	0.136	6.0
70	72.1	0.082	0.080	6.8
75	77.2	0.078	0.076	4.7
82	84.2	0.050	0.049	6.9
90	92.3	0.039	0.039	10.4
110	112.2	0.0052	0.0054	23.3

Table 8. Tabulated Differential Cross Sections

$^{27}Al(p,d)^{26}Al$
E_p = 62 MeV
Q = -10.83 MeV
Ground State

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	16.0	3.67	3.27	5.0
20.8	22.0	1.44	1.28	8.8
25	26.4	1.34	1.21	3.2
30	31.7	1.20	1.08	1.6
35	37.0	1.04	0.943	2.3
40	42.3	0.642	0.587	2.7
45	47.4	0.547	0.503	2.1
50	52.6	0.313	0.290	3.5
55	57.8	0.219	0.205	4.1
60	63.0	0.191	0.180	6.2
65	68.1	0.107	0.102	5.9
70	73.2	0.073	0.070	7.3
75	78.3	0.047	0.046	5.5
82	85.4	0.037	0.036	7.1
90	93.5	0.017	0.017	15.2
110	113.3	0.0030	0.0031	35.7

Table 9. Tabulated Differential Cross Sections

$^{27}Al(p,d)^{26}Al$
E_p = 62 MeV
Q = -11.89 MeV
1.06-MeV State

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	16.0	0.985	0.878	10.7
20.8	22.1	0.494	0.441	16.0
25	26.4	0.410	0.367	6.0
30	31.7	0.339	0.305	3.1
35	37.0	0.310	0.281	4.4
40	42.3	0.183	0.167	5.3
45	47.4	0.136	0.125	9.5
50	52.6	0.075	0.069	7.9
55	57.8	0.067	0.063	7.9
60	63.0	0.053	0.050	11.9
65	68.1	0.030	0.029	12.2
70	73.2	0.019	0.018	15.5
75	78.3	0.015	0.014	10.8
82	85.4	0.013	0.013	12.1
90	93.5	0.0035	0.0035	36.7
110	113.3	0.0024	0.0025	35.1

Table 10. Tabulated Differential Cross Sections

$^{27}Al(p,d)^{26}Al$
E_p = 62 MeV
Q = -12.90 MeV
2.07-MeV State

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	16.0	1.12	0.994	11.6
20.8	22.1	1.206	1.07	9.9
25	26.4	0.603	0.540	4.9
30	31.7	0.464	0.417	3.1
35	37.0	0.397	0.360	4.1
40	42.3	0.293	0.267	4.0
50	52.6	0.145	0.135	5.8
55	57.9	0.099	0.092	6.5
60	63.0	0.099	0.093	8.7
65	68.1	0.073	0.069	8.0
70	73.3	0.042	0.040	12.7
75	78.3	0.015	0.014	15.2

Table 11. Tabulated Differential Cross Sections

$^{27}Al(p,d)^{26}Al$
E_p = 62 MeV
Q = -15.56 MeV
4.73-MeV State

Lab Angle (deg)	C.M. Angle (deg)	Cross Section (Lab) (mb/sr)	Cross Section (C.M.) (mb/sr)	Statistical Uncertainty (± %)
15	16.0	0.952	0.843	16.2
20.8	22.1	0.758	0.674	17.3
25	26.4	0.642	0.573	6.5
30	31.8	0.575	0.516	2.3
35	37.2	0.487	0.439	5.0
40	42.3	0.368	0.334	4.8
45	47.5	0.269	0.246	4.9
50	52.7	0.198	0.183	6.3
55	58.0	0.11	0.103	9.7
60	63.1	0.134	0.126	9.5
65	68.3	0.106	0.100	7.6
70	73.4	0.045	0.043	13.2
75	78.3	0.036	0.035	9.7
82	85.4	0.025	0.025	12.7
90	93.5	0.015	0.015	21.9

Table 12. $^{22}Al(p,p)^{27}Al$

E_p = 28.8 MeV

Elastic Scattering

Lab Angle	Cross Section (Lab) (mb/sr)	Statistical Error ($\pm$ mb/sr)
11	3240	6.97
30	169	0.61
60	38.0	0.19

Table 13. Angle-Integrated Cross Sections

^{27}Al

Bin Energy[a] (MeV)	Cross Section (mb/MeV)	Error (mb/MeV)	Bin Energy (MeV)	Cross Section (mb/MeV	Error (mb/MeV)	Bin Energy (MeV)	Cross Section (mb/MeV)	Error (mb/MeV)
	Protons		50.00	4.60	0.064	28.00	1.11	0.016
2.59	65.53	0.995	52.00	4.63	0.064	30.00	1.06	0.016
2.99	71.19	0.711	54.00	3.43	0.062	32.00	1.00	0.015
3.40	65.83	0.582	54.00	3.85	0.062	34.00	1.04	0.017
3.80	60.94	0.543	58.00	5.78	0.075	36.00	1.01	0.016
4.20	57.12	0.524	60.00	2.45	0.105	38.00	1.12	0.017
4.60	52.64	0.495	60.93			40.00	1.49	0.022
5.02	48.36	0.469				42.00	1.61	0.022
5.41	44.37	0.455				44.00	2.26	0.028
5.81	41.59	0.436		Deuteron		46.00	1.88	0.026
6.21	38.60	0.419				48.00	0.91	0.027
6.62	33.97	0.182	2.44	3.35	0.167	50.00	0.97	0.027
7.62	30.10	0.146	2.84	3.83	0.094	51.53		
8.63	23.40	0.128	3.25	4.26	0.096		Triton	
9.64	19.96	0.118	3.65	4.50	0.095			
10.64	17.62	0.110	4.05	4.74	0.096	6.21	0.707	0.102
11.65	15.68	0.103	4.45	4.84	0.101	6.61	0.561	0.018
12.65	14.22	0.098	4.85	4.77	0.101	7.62	0.581	0.019
13.66	13.21	0.093	5.26	4.10	0.084	8.63	0.488	0.016
14.67	12.13	0.088	5.66	4.08	0.085	9.63	0.450	0.015
15.67	11.44	0.085	6.06	4.05	0.085	10.64	0.416	0.015
16.68	10.81	0.081	6.46	3.81	0.080	11.64	0.398	0.015
17.68	10.21	0.079	6.87	3.46	0.047	12.65	0.379	0.014
18.69	9.94	0.068	7.87	3.13	0.045	13.66	0.316	0.012
20.00	9.28	0.052	8.88	2.86	0.042	14.66	0.283	0.011
22.00	8.81	0.050	9.88	2.63	0.039	15.67	0.268	0.011
24.00	8.29	0.048	10.89	2.48	0.038	16.67	0.266	0.012
26.00	7.98	0.047	11.90	1.94	0.034	17.68	0.243	0.011
28.00	7.62	0.046	12.90	1.82	0.031	18.69	0.227	0.008
30.00	7.19	0.044	13.91	1.69	0.030	20.00	0.206	0.007
32.00	7.03	0.043	14.91	1.62	0.029	22.00	0.195	0.007
34.00	6.86	0.043	15.92	1.53	0.028	24.00	0.180	0.007
36.00	6.65	0.042	16.93	1.47	0.028	26.00	0.166	0.006
38.00	6.67	0.047	17.93	1.45	0.027	28.00	0.159	0.006
40.00	6.88	0.057	18.94	1.38	0.025	30.00	0.158	0.006
42.00	6.45	0.062	20.00	1.33	0.018	32.00	0.163	0.006
44.00	5.94	0.066	22.00	1.27	0.017	34.00	0.162	0.006
46.00	5.12	0.065	24.00	1.20	0.016	36.00	0.139	0.006
48.00	4.95	0.065	26.00	1.16	0.016	38.00	0.091	0.006

a. Bin energy listed is the low-energy edge of the bin. The highest bin energy listed is the upper edge of the last bin.

Table 13. (Cont.)

Bin Energy (MeV)	Cross Section (Mb/MeV)	Error (mb/MeV)
40.00	0.055	0.004
42.00	0.084	0.006
44.00	0.052	0.005
45.95		
	Helium-3	
6.65	1.007	0.145
7.05	0.830	0.099
7.45	0.761	0.090
7.85	0.819	0.100
8.25	0.736	0.062
8.65	0.733	0.054
9.06	0.708	0.050
9.46	0.636	0.046
9.86	0.607	0.033
10.86	0.564	0.028
11.86	0.516	0.027
12.87	0.455	0.022
13.87	0.400	0.017
14.87	0.348	0.015
15.88	0.323	0.015
16.88	0.326	0.015
17.88	0.303	0.013
18.89	0.280	0.012
20.00	0.253	0.008
22.00	0.228	0.008
24.00	0.196	0.007
26.00	0.183	0.007
28.00	0.173	0.006
30.00	0.164	0.006
32.00	0.158	0.006
34.00	0.139	0.006
36.00	0.138	0.006
38.00	0.148	0.007
40.00	0.154	0.007
42.00	0.127	0.008
44.00	0.051	0.004
46.00	0.053	0.004
48.00	0.020	0.003
50.03		

Bin Energy (MeV)	Cross Section (mb/MeV)	Error (mb/MeV)
	Alpha	
2.85	16.898	0.343
3.25	18.812	0.261
3.65	21.106	0.310
4.05	21.961	0.313
4.46	22.316	0.316
4.86	21.791	0.310
5.26	21.012	0.301
5.67	20.356	0.253
6.07	19.377	0.239
6.47	18.413	0.212
6.87	17.292	0.204
7.28	15.857	0.195
7.68	14.449	0.183
8.08	13.088	0.173
8.49	11.735	0.161
8.89	10.896	0.157
9.29	9.696	0.148
9.69	8.043	0.084
10.70	6.362	0.075
11.71	5.158	0.068
12.72	3.960	0.059
13.72	3.028	0.051
14.73	2.368	0.037
15.74	2.011	0.036
16.74	1.653	0.030
17.75	1.410	0.029
18.76	1.178	0.024
20.00	0.954	0.016
22.00	0.723	0.014
24.00	0.599	0.013
26.00	0.498	0.011
28.00	0.411	0.010
30.00	0.337	0.009
32.00	0.285	0.009
34.00	0.272	0.009
36.00	0.193	0.007

Bin Energy (MeV)	Cross Section (mb/MeV)	Error (mb/MeV)
38.00	0.212	0.008
40.00	0.184	0.007
42.00	0.157	0.007
44.00	0.127	0.006
46.00	0.099	0.006
48.00	0.083	0.006
50.00	0.052	0.005
52.00	0.022	0.003
54.00	0.008	0.002
56.00	0.003	0.001
58.00	0.008	0.002
60.00	0.001	0.001
60.89		

Table 14. Energy Integrated Total Differential Cross Sections and Average Energy for ^{27}Al

Lab Angle deg	Proton[a] $\sigma \pm \Delta\sigma$ (mb/sr)	$\bar{E}$[b] (MeV)	COE[c] (MeV)	Deuteron $\sigma \pm \Delta\sigma$ (mb/sr)	$\bar{E}$ (MeV)	COE (MeV)	Triton $\sigma \pm \Delta\sigma$ (mb/sr)	$\bar{E}$ (MeV)	COE (MeV)
				62 MeV					
12	249.6 ± 1.2[d]	29.6	2.82	40.65 ± 0.5	35.5	2.67	3.50 ± 0.14	26.6	6.29
15	223.2 ± 1.5	30.3	2.62	36.67 ± 0.6	35.0	2.47	3.28 ± 0.17	26.0	6.29
25	163.9 ± 5.4[e]	28.5	2.74	22.03 ± 0.2	29.4	2.84	2.74 ± 0.1	23.6	6.38
30	130.1 ± 0.2	28.8	3.44	20.16 ± 0.1	28.1	2.84	2.46 ± 0.03	22.8	6.57
35	112.7 ± 0.3	26.9	3.08	17.37 ± 0.1	27.9	2.84	1.95 ± 0.03	21.7	6.67
40	102.6 ± 0.2	24.3	3.19	14.28 ± 0.1	25.7	2.94	1.60 ± 0.03	20.8	6.68
45	91.9 ± 0.2	23.2	3.44	13.28 ± 0.1	23.8	2.80	1.58 ± 0.02	20.2	6.60
50	75.5 ± 0.2	21.5	3.04	9.89 ± 0.1	23.2	2.79	1.15 ± 0.02	19.6	6.58
55	71.6 ± 0.2	18.5	1.90	8.80 ± 0.1	22.0	2.95	0.94 ± 0.02	18.3	6.54
60	56.3 ± 0.2	18.1	2.79	7.67 ± 0.1	20.5	2.46	0.81 ± 0.02	17.7	6.22
65	59.8 ± 0.2	15.2	1.90	6.76 ± 0.1	18.7	2.80	0.65 ± 0.02	16.9	6.59
70	48.7 ± 0.1	15.4	3.04	5.95 ± 0.1	17.4	2.85	0.59 ± 0.01	16.5	6.74
75	43.4 ± 0.1	14.2	3.07	3.15 ± 0.1	15.9	2.87	0.48 ± 0.01	15.5	6.64
82	39.4 ± 0.1	13.0	3.08	4.55 ± 0.1	14.5	2.88	0.41 ± 0.01	14.8	6.60
90	34.1 ± 0.1	11.2	2.62	3.65 ± 0.1	13.0	2.11	0.32 ± 0.01	13.9	6.24
110	31.1 ± 0.1	9.1	2.41	2.94 ± 0.1	10.4	2.26	0.23 ± 0.01	12.2	6.24
160	26.8 ± 0.2	8.6	2.91	2.43 ± 0.1	7.9	2.45	0.15 ± 0.01	11.7	6.43
				28.8 MeV					
11	213 ± 1.9	14.5	1.81	14.5 ± 0.5	13.5	4.22	1.08 ± 0.1	10.9	6.23
30	95.4 ± 0.5	11.9	1.81	10.8 ± 0.2	12.4	1.71	0.81 ± 0.04	11.0	6.23
60	62.6 ± 0.3	9.1	1.61	4.3 ± 0.1	9.5	1.51	0.32 ± 0.02	10.2	6.24

a) does not include elastic scattering

b) average energy

c) low-energy cutoff

d) statistical error

e) error includes uncertainty in tail correction - see text

Table 14. (continued)

Lab Angle deg	Helium-3 σ ± Δσ (mb/sr)	Helium-3 $\bar{E}$ (MeV)	Helium-3 COE (MeV)	Alpha σ ± Δσ (mb/sr)	Alpha $\bar{E}$ (MeV)	Alpha COE (MeV)
			62 MeV			
12	3.71 ± 0.4	28.9	6.65	27.17 ± 0.4	13.4	2.87
15	3.47 ± 0.17	27.9	6.69	27.08 ± 0.5	13.6	3.02
25	2.67 ± 0.06	26.3	8.13	19.68 ± 0.2	14.7	6.33
30	2.32 ± 0.03	25.3	8.12	22.72 ± 0.2	11.9	3.01
35	1.94 ± 0.03	24.2	8.19	17.95 ± 0.01	13.0	5.41
40	1.30 ± 0.02	26.7	13.05	4.21 ± 0.1	23.9	14.45
45	1.14 ± 0.02	25.8	13.08	3.93 ± 0.1	23.7	14.48
55	0.69 ± 0.02	24.0	13.08	2.39 ± 0.1	22.6	14.47
60	0.96 ± 0.03	17.8	6.62	15.21 ± 0.1	9.2	2.86
65	0.79 ± 0.02	19.1	8.14	8.85 ± 0.1	11.7	6.44
70	0.45 ± 0.01	22.7	13.13	1.45 ± 0.1	21.6	14.52
75	0.60 ± 0.01	17.4	8.25	8.62 ± 0.1	10.3	5.58
82	0.51 ± 0.01	16.7	8.29	7.38 ± 0.1	10.1	5.71
90	0.47 ± 0.01	14.7	6.74	10.59 ± 0.1	7.5	2.92
110	0.35 ± 0.01	12.8	6.64	9.88 ± 0.1	6.6	2.72
135	0.33 ± 0.03	12.1	6.95	8.54 ± 0.1	6.8	3.40
160	0.078 ± 0.01	16.6	12.45	6.79 ± 0.1	6.4	3.42
			28.8 MeV			
11	0.344 ± 0.07	14.2	6.63	27.3 ± 0.6	8.9	2.51
30	0.113 ± 0.02	14.6	6.64	23.3 ± 0.2	8.7	2.51
60	0.085 ± 0.01	9.0	6.64	16.1 ± 0.1	7.6	2.51

Table 15. Total Cross Sections

^{27}Al 62-MeV Incident Protons

Particle	$\sigma \pm \Delta\sigma$ (mb)	$\overline{E}^a$ (MeV)	$\overline{pc}^b$ (MeV)	Lower Energy Limit (MeV)
Proton[c]	705.6 ± 1.0	18.9	82.1	2.4
Deuteron	88.7 ± 0.3	22.5	154.6	2.4
Triton	8.88 ± 0.1	19.4	185.7	6.2
Helium-3	11.04 ± 0.2	19.7	166.5	6.7
Alpha	165.0 ± 0.5	9.0	68.6	2.9

a) average energy

b) average forward momentum

c) the proton cross section does not include elastic scattering

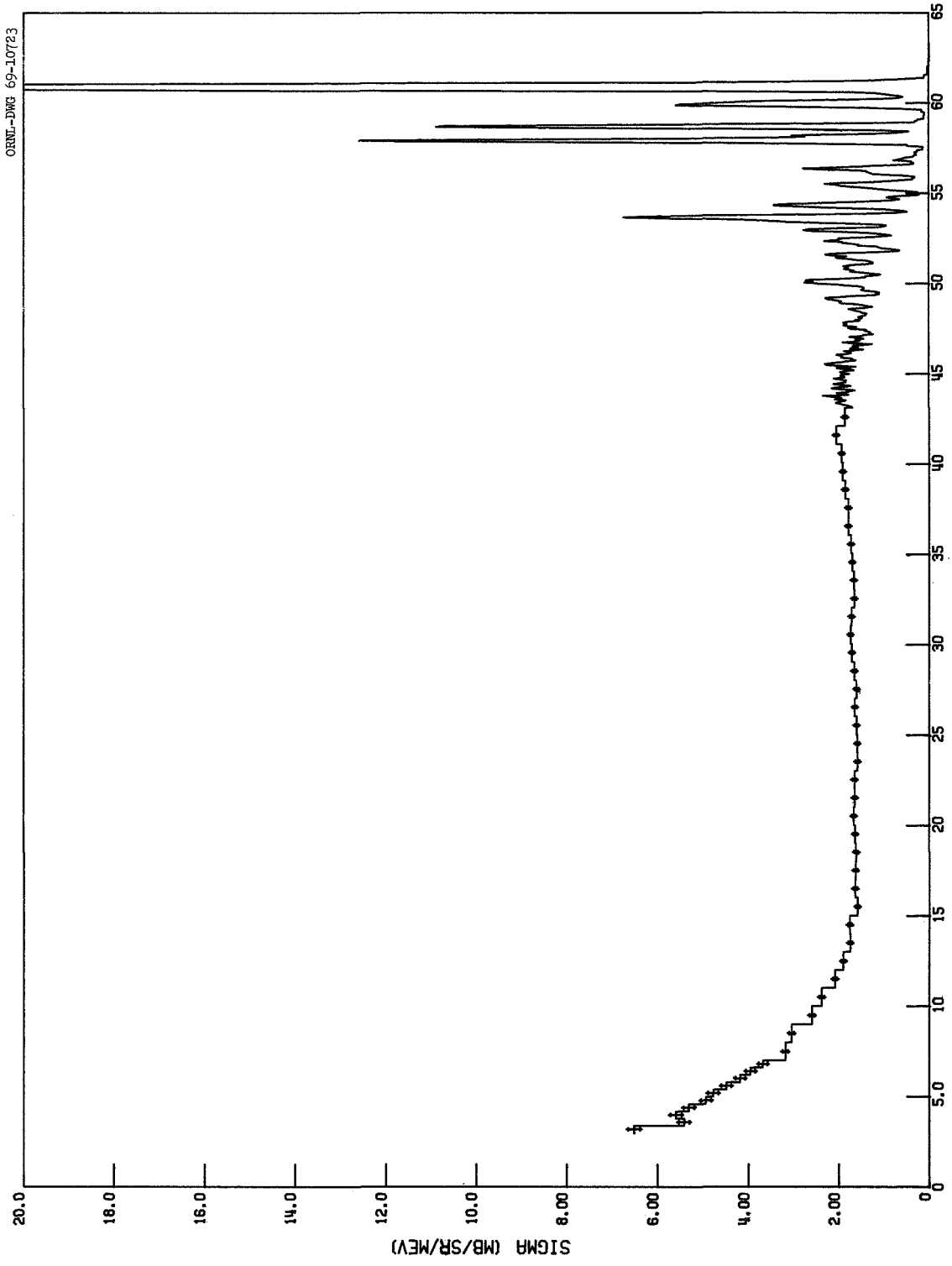

Fig. 1. Proton Spectrum from ^{27}Al at 30° 61.5-MeV Protons Incident

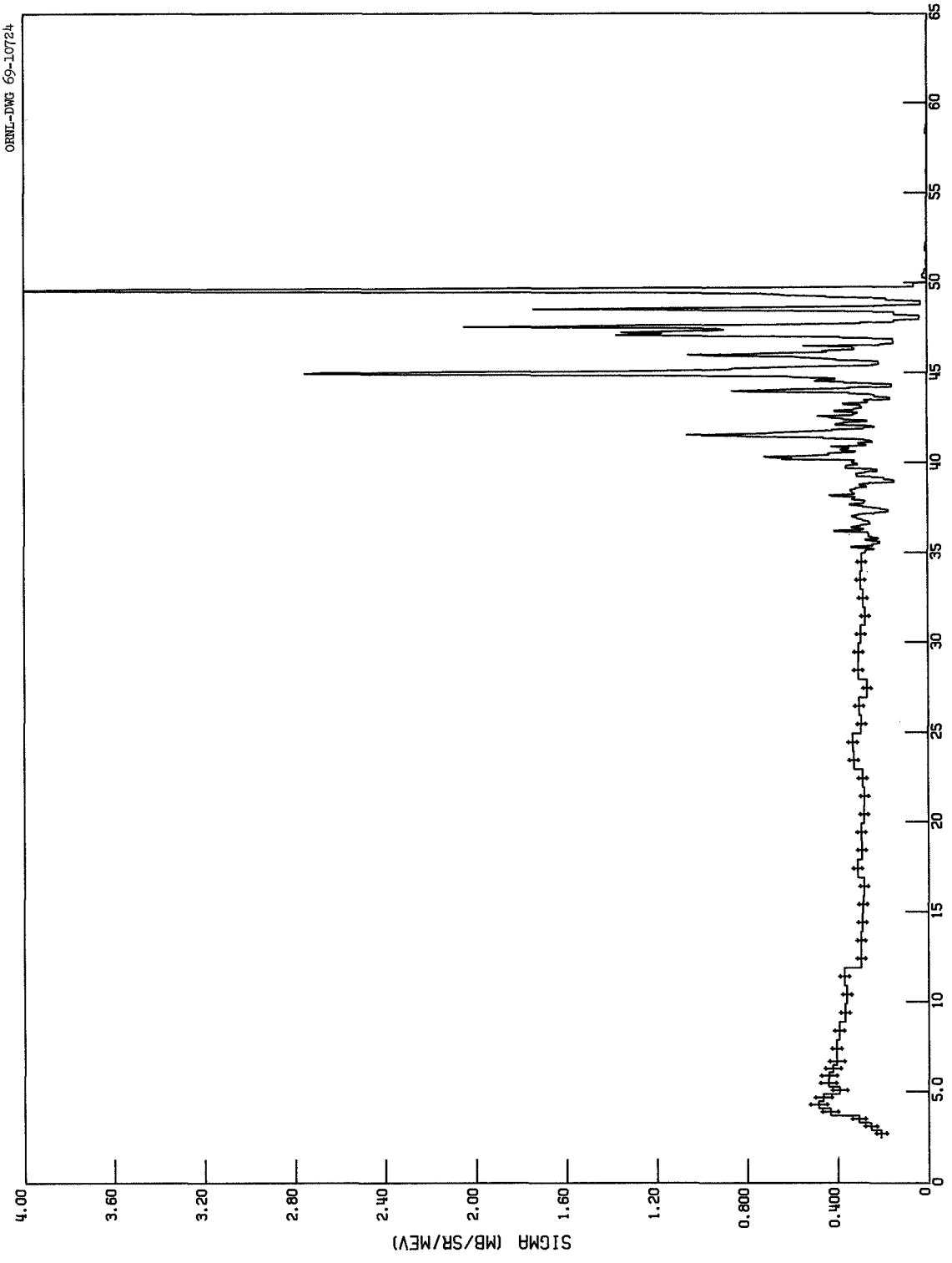

Fig. 2. Deuteron Spectrum from ^{27}Al at 30° 61.5-MeV Protons Incident

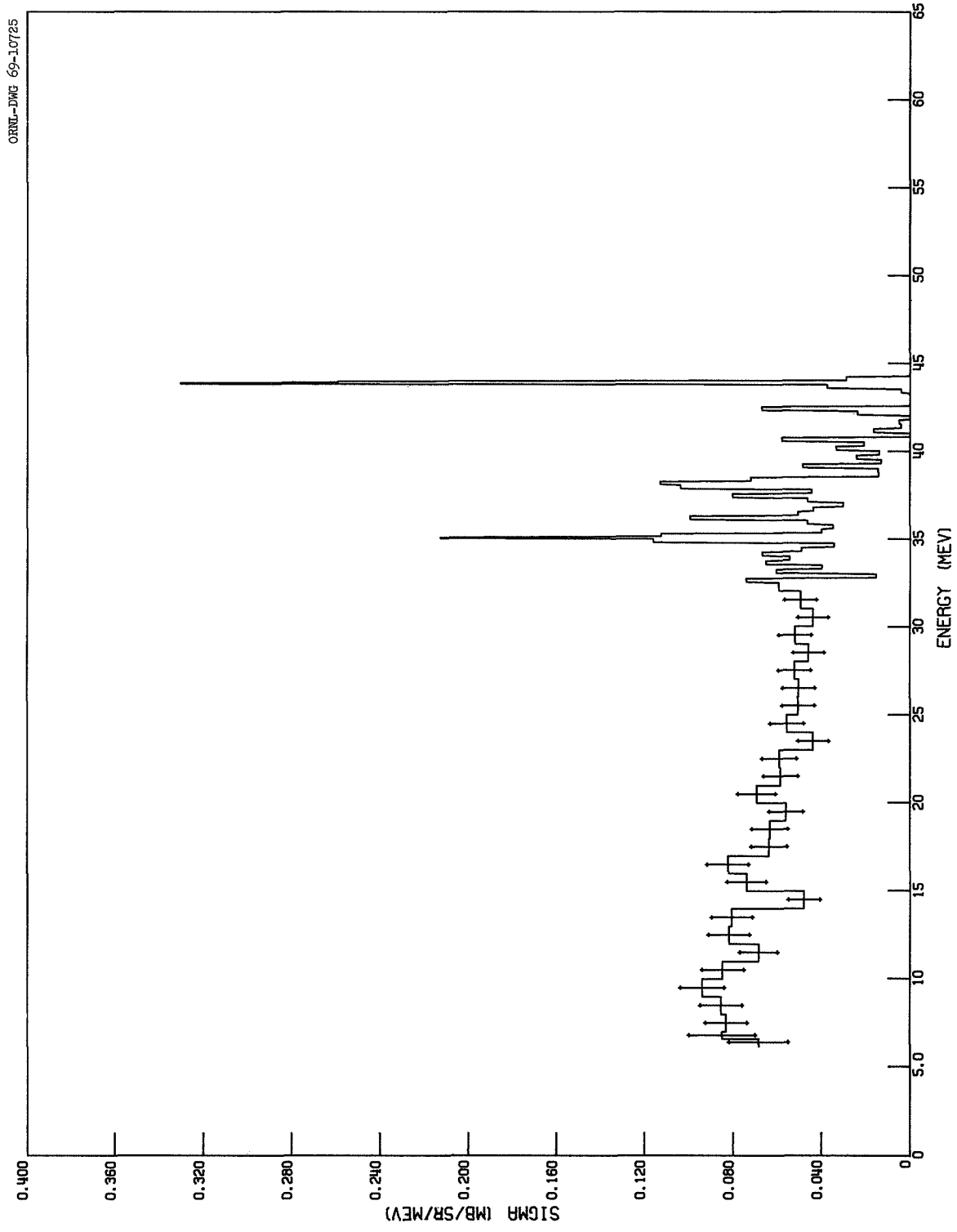

Fig. 3. Triton Spectrum from ^{27}Al at 30° 61.5-MeV Protons Incident

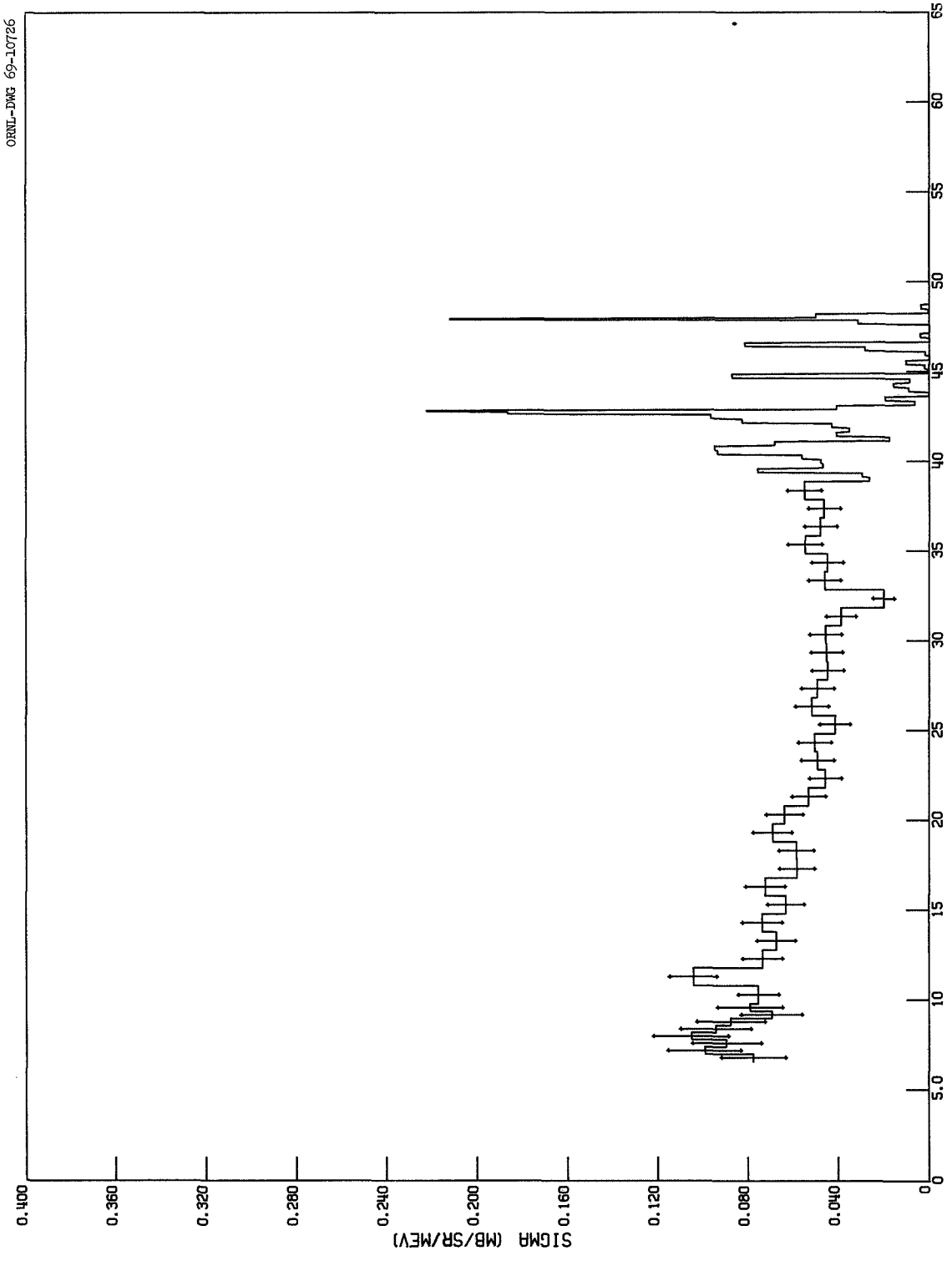

Fig. 4. Helium-3 Spectrum from ^{27}Al at 30° 61.5-MeV Protons Incident

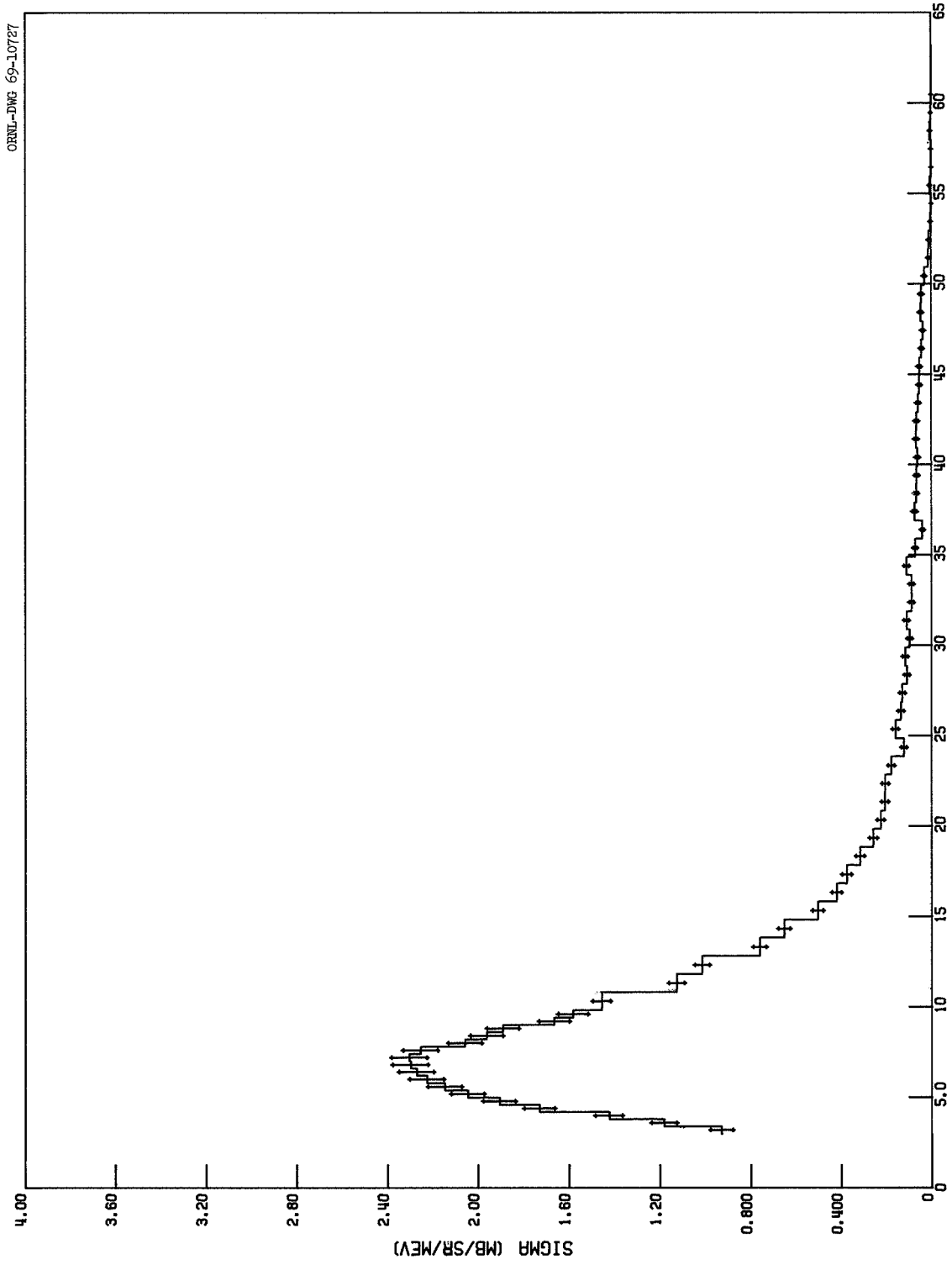

Fig. 5. Alpha Spectrum from ^{27}Al at 30° 61.5-MeV Protons Incident

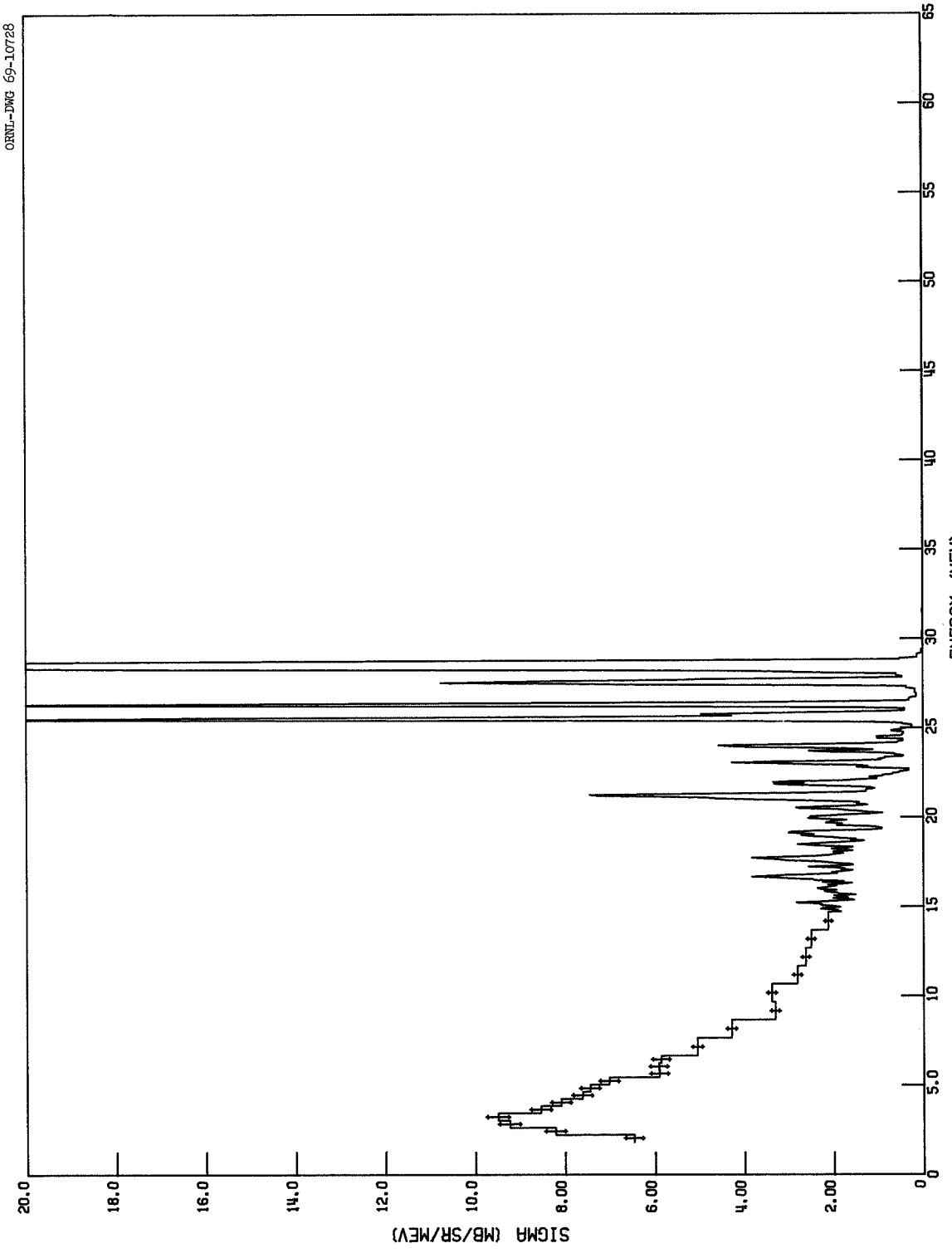

Fig. 6. Proton Spectrum from ^{27}Al at 30° 28.8-MeV Protons Incident

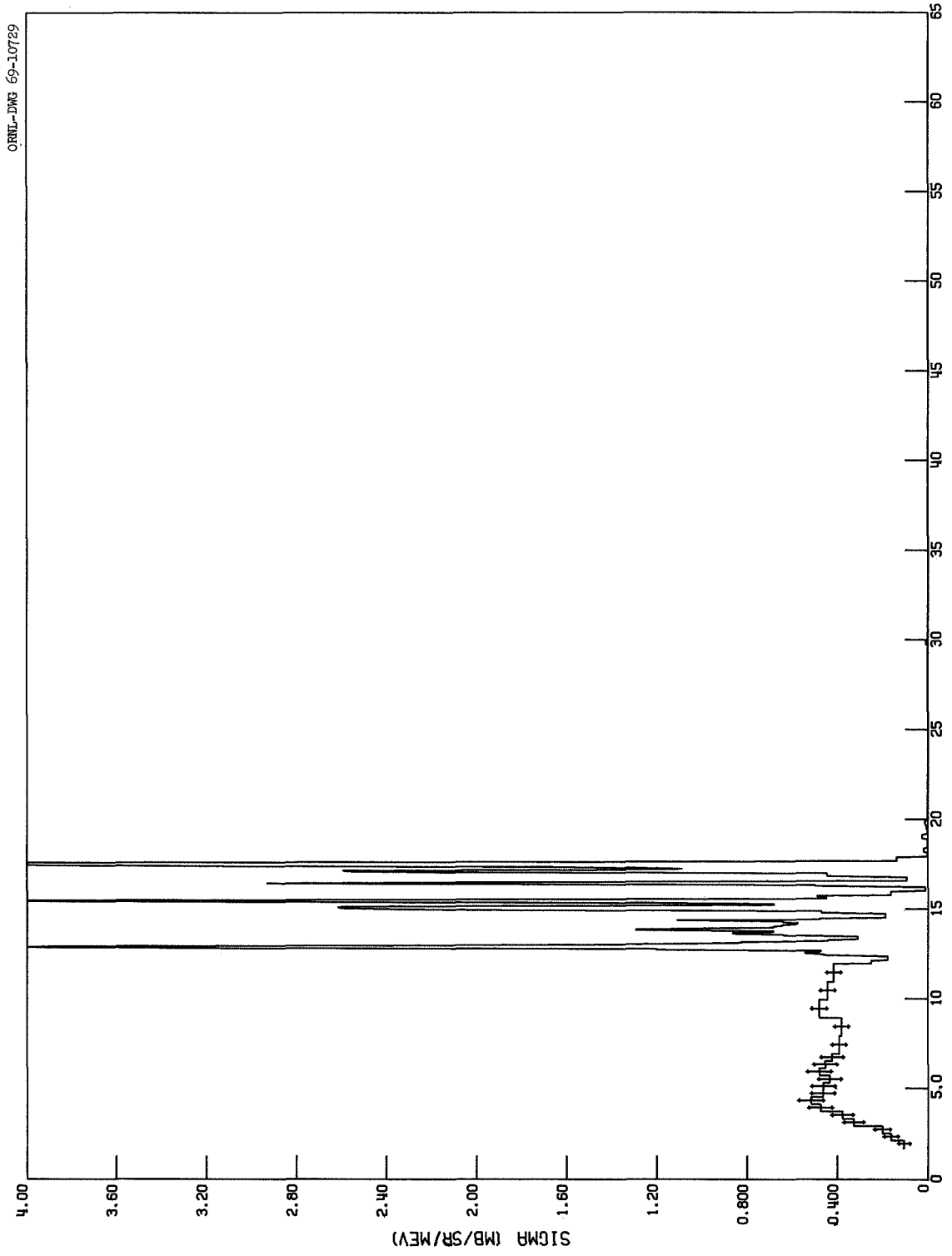

Fig. 7. Deuteron Spectrum from ^{27}Al at 30° 28.8-MeV Protons Incident

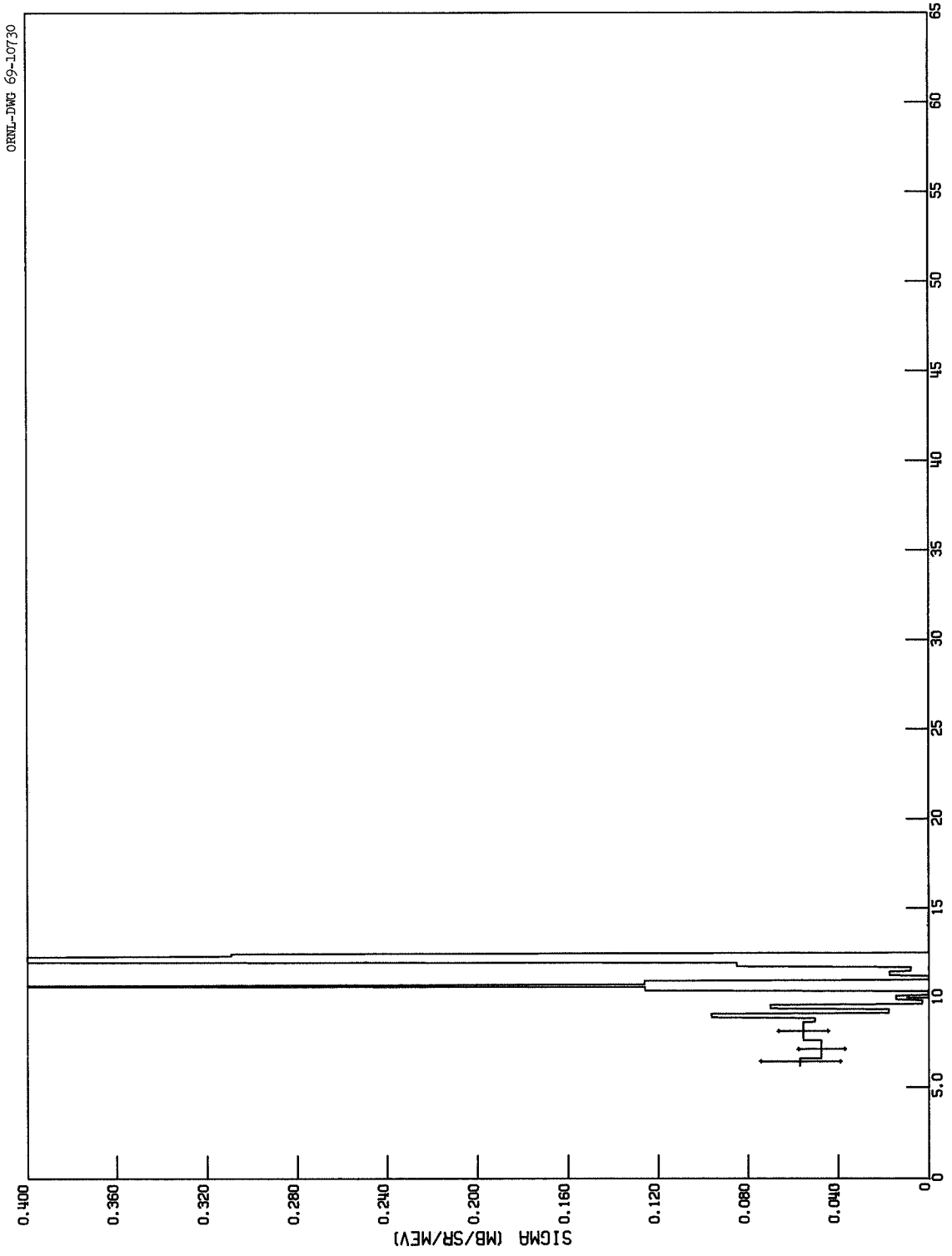

Fig. 8. Triton Spectrum from ^{27}Al at 30° 28.8-MeV Protons Incident

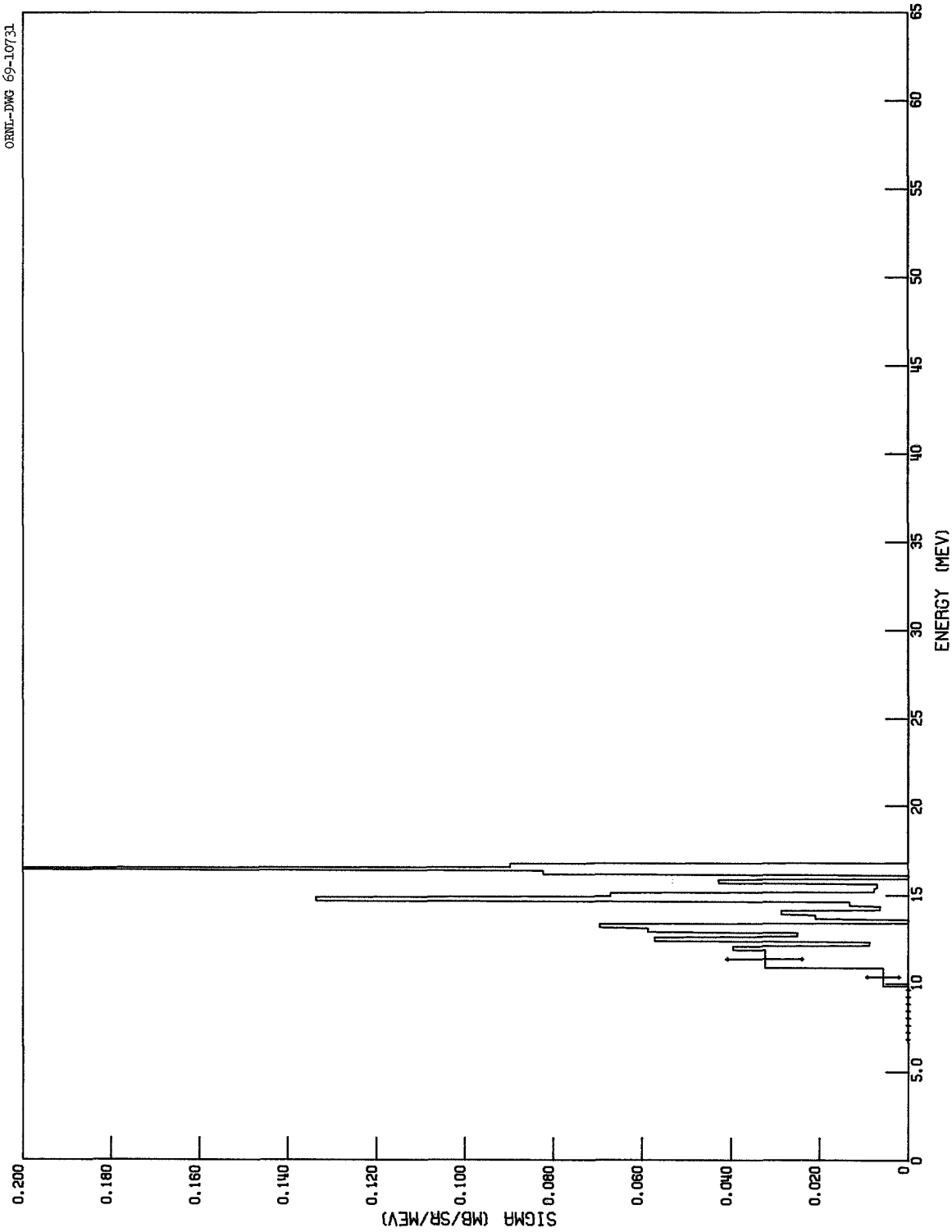

Fig. 9. Helium-3 Spectrum from ^{27}Al at 30° 28.8-MeV Protons Incident

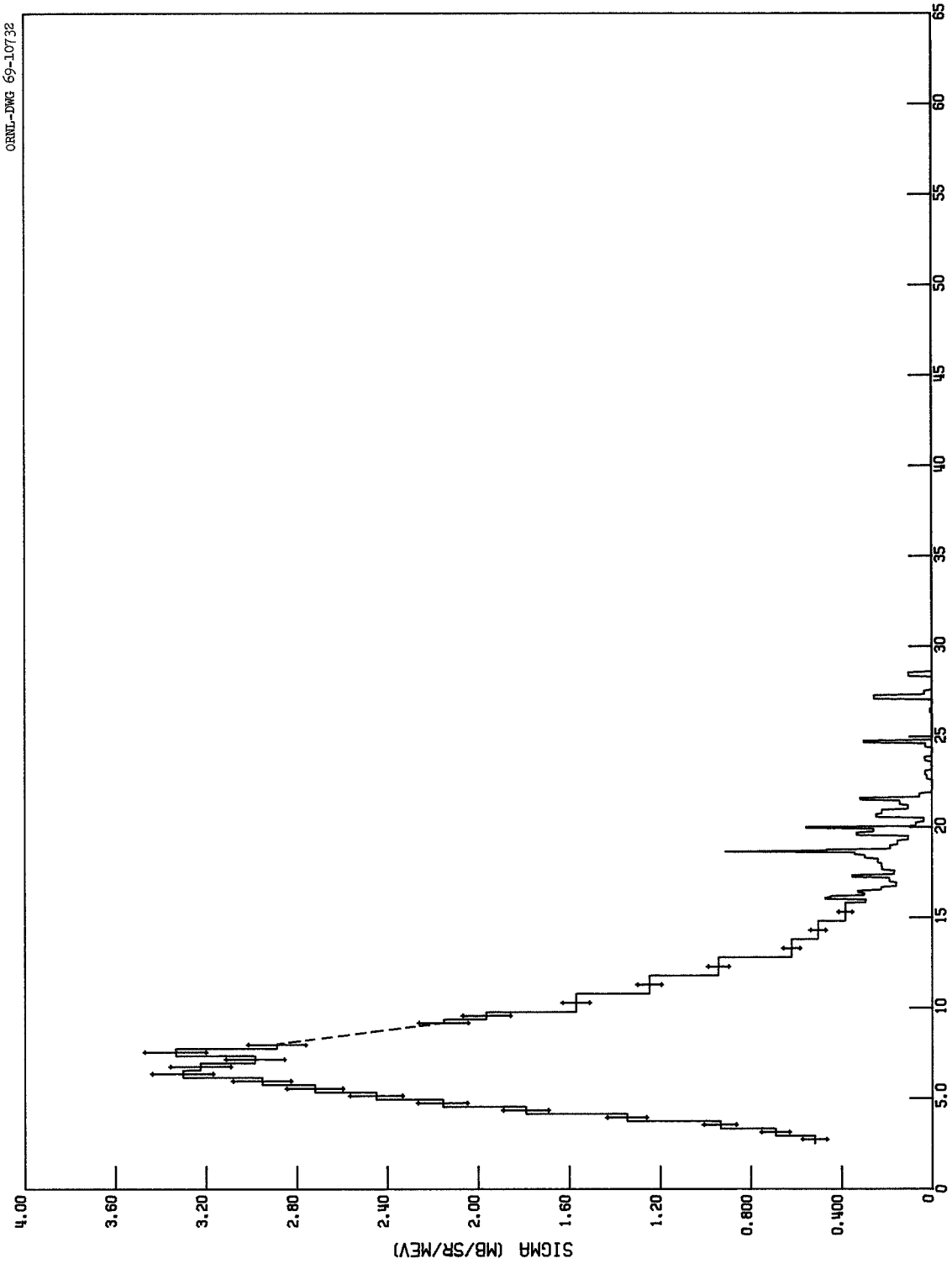

Fig. 10. Alpha Spectrum from ^{27}Al at 30° 28.8-MeV Protons Incident

TABLE 16

PROTON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

12 DEG - RUN 117			15 DEG - RUN 116			25 DEG - RUN 2047			30 DEG - RUN 7106			35 DEG - RUN 2004		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
3.00	6.53	0.29	2.79	5.58	0.34	2.97	6.77	0.15	3.71	5.75	0.06	3.26	6.47	0.09
3.40	6.87	0.30	3.19	6.81	0.38	3.36	7.00	0.15	4.11	6.30	0.07	3.66	5.70	0.09
3.80	6.50	0.29	3.60	5.93	0.35	3.76	6.94	0.15	4.51	5.85	0.07	4.07	5.57	0.09
4.21	6.84	0.30	4.00	6.43	0.37	4.16	6.72	0.15	4.90	5.67	0.06	4.47	5.23	0.08
4.61	6.21	0.28	4.40	6.50	0.37	4.56	6.18	0.14	5.30	5.33	0.06	4.88	5.07	0.08
5.01	6.74	0.30	4.80	5.83	0.35	4.96	6.24	0.14	5.70	5.01	0.06	5.28	4.74	0.08
5.41	5.83	0.28	5.21	5.96	0.35	5.36	5.52	0.13	6.10	4.78	0.06	5.68	4.47	0.08
5.82	6.30	0.29	5.61	6.44	0.37	5.76	5.51	0.13	6.50	4.48	0.06	6.09	4.34	0.08
6.22	5.79	0.27	6.01	5.98	0.35	6.16	5.21	0.13	7.19	4.05	0.03	6.49	3.85	0.07
6.62	5.69	0.27	6.41	5.16	0.33	6.56	5.02	0.13	8.19	3.70	0.03	7.20	3.56	0.04
7.33	5.65	0.17	7.12	4.77	0.20	7.25	4.71	0.08	9.19	3.43	0.03	8.21	3.50	0.04
8.33	5.81	0.17	8.12	5.03	0.21	8.25	4.27	0.07	10.18	2.79	0.03	9.22	2.22	0.03
9.34	4.83	0.16	9.13	3.96	0.18	9.25	3.57	0.07	11.18	2.31	0.03	10.23	2.43	0.04
10.35	4.48	0.15	10.14	4.43	0.19	10.24	3.15	0.06	12.17	2.20	0.03	11.24	2.13	0.03
11.36	4.51	0.15	11.14	3.81	0.18	11.24	3.17	0.06	13.17	2.04	0.02	12.25	2.00	0.03
12.36	4.66	0.16	12.15	3.73	0.18	12.24	2.88	0.06	14.17	1.92	0.02	13.26	1.89	0.03
13.37	4.11	0.15	13.15	3.65	0.17	13.24	2.83	0.06	15.16	1.89	0.02	14.28	1.83	0.03
14.38	4.21	0.15	14.16	3.55	0.17	14.23	2.76	0.06	16.16	1.86	0.02	15.29	1.78	0.03
15.38	3.99	0.14	15.17	3.37	0.17	15.23	2.57	0.06	17.15	1.83	0.02	16.30	1.69	0.03
16.39	3.87	0.14	16.17	3.65	0.18	16.23	2.57	0.06	18.15	1.86	0.02	17.31	1.65	0.03
17.40	3.81	0.14	17.18	3.07	0.16	17.22	2.63	0.06	19.14	1.84	0.02	18.32	1.71	0.03
18.41	3.83	0.14	18.18	3.45	0.17	18.22	2.41	0.06	20.14	1.82	0.02	19.33	1.69	0.03
19.41	4.05	0.15	19.19	3.64	0.17	19.22	2.45	0.06	21.14	1.83	0.02	20.34	1.64	0.03
20.42	3.87	0.14	20.20	3.55	0.17	20.21	2.47	0.06	22.13	1.87	0.02	21.35	1.73	0.03
21.43	4.00	0.14	21.20	3.19	0.16	21.21	2.33	0.05	23.13	1.88	0.02	22.36	1.63	0.03
22.44	4.12	0.15	22.21	3.69	0.18	22.21	2.38	0.05	24.12	1.85	0.02	23.37	1.68	0.03
23.44	4.36	0.15	23.21	3.54	0.17	23.21	2.34	0.05	25.12	1.86	0.02	24.38	1.67	0.03
24.45	4.41	0.15	24.22	3.37	0.17	24.20	2.24	0.05	26.11	1.90	0.02	25.39	1.71	0.03
25.46	4.21	0.15	25.23	3.56	0.17	25.20	2.28	0.05	27.11	1.87	0.02	26.40	1.67	0.03
26.46	4.78	0.16	26.23	3.58	0.17	26.20	2.29	0.05	28.11	1.89	0.02	27.41	1.64	0.03
27.47	4.48	0.15	27.24	3.66	0.18	27.19	2.27	0.05	29.10	1.89	0.02	28.42	1.67	0.03
28.48	4.48	0.15	28.24	3.60	0.17	28.19	2.20	0.05	30.10	1.91	0.02	29.44	1.72	0.03
29.49	4.42	0.15	29.25	3.81	0.18	29.19	2.23	0.05	31.09	1.86	0.02	30.45	1.70	0.03
30.49	4.45	0.15	30.26	3.59	0.17	30.18	2.27	0.05	32.09	1.89	0.02	31.46	1.70	0.03
31.50	4.19	0.15	31.26	3.51	0.17	31.18	2.21	0.05	33.09	1.96	0.02	32.47	1.70	0.03
32.51	4.54	0.15	32.27	3.61	0.17	32.18	2.11	0.05	34.08	2.00	0.02	33.48	1.69	0.03
33.51	4.18	0.15	33.27	3.73	0.18	33.18	2.14	0.05	35.08	2.00	0.02	34.49	1.64	0.03
34.52	4.69	0.16	34.28	3.50	0.17	34.17	2.23	0.05	36.07	2.06	0.02	35.50	1.73	0.03
35.53	4.71	0.16	35.29	3.69	0.18	35.17	2.31	0.05	37.07	2.11	0.02	36.51	1.71	0.03
36.54	4.30	0.15	36.29	3.76	0.18	36.17	2.37	0.05	38.06	2.19	0.03	37.52	1.76	0.03
37.54	4.26	0.15	37.30	3.41	0.17	37.16	2.38	0.05	39.06	2.23	0.03	38.53	1.88	0.03
38.55	4.36	0.15	38.30	3.51	0.17	38.16	2.60	0.08	40.06	2.21	0.03	39.54	1.89	0.03
39.56	4.13	0.15	39.31	3.90	0.18	39.16	2.64	0.12	41.05	2.27	0.03	40.55	1.78	0.03
40.56	5.34	0.17	40.32	4.22	0.19	40.15	2.62	0.15	42.05	2.20	0.03	41.56	1.78	0.03
41.57	5.55	0.17	41.32	5.16	0.21	41.15	2.77	0.17	43.04	2.19	0.03	42.57	1.71	0.03
42.58	5.07	0.16	42.33	4.49	0.19	42.15	2.81	0.19	44.04	2.13	0.03	43.58	1.77	0.03
43.59	4.87	0.16	43.33	4.05	0.18	43.15	2.67	0.21	45.04	2.16	0.03	44.60	1.66	0.03
44.59	4.55	0.15	44.34	3.95	0.18	44.14	2.74	0.23	46.03	1.76	0.02	45.61	1.68	0.03
45.60	4.39	0.15	45.35	3.84	0.18	45.14	2.63	0.25	47.03	1.83	0.02	46.62	1.52	0.03
46.61	3.51	0.14	46.35	3.22	0.16	46.14	2.67	0.25	48.02	2.01	0.02	47.63	1.56	0.03
47.62	3.38	0.13	47.36	2.46	0.14	47.13	2.29	0.25	49.02	2.03	0.02	48.64	1.51	0.03
48.62	3.71	0.14	48.36	2.75	0.15	48.13	2.25	0.25	50.01	1.82	0.02	49.65	1.57	0.03
49.63	3.13	0.13	49.37	2.94	0.16	49.13	2.34	0.25	51.01	1.66	0.02	50.66	1.61	0.03
50.64	2.91	0.12	50.38	2.61	0.15	50.12	2.28	0.25	52.01	1.99	0.02	51.67	1.28	0.03
51.64	3.03	0.13	51.38	2.91	0.16	51.12	2.25	0.25	53.00	3.11	0.03	52.68	1.62	0.03
52.65	2.88	0.12	52.39	2.47	0.14	52.12	1.93	0.25	54.00	1.49	0.02	53.69	2.45	0.04
53.66	2.44	0.11	53.39	2.37	0.14	53.12	2.18	0.25	54.99	1.27	0.02	54.70	1.26	0.03
54.67	2.097	0.105	54.40	2.215	0.136	54.11	2.870	0.250	55.99	1.058	0.018	55.71	0.791	0.021
55.67	1.935	0.100	55.41	1.631	0.117	55.11	1.870	0.250	56.98	3.629	0.033	56.72	1.065	0.024
56.68	1.69	0.09	56.41	1.72	0.12	56.11	1.45	0.25	57.98	3.54	0.03	57.73	1.62	0.03
57.69	3.65	0.14	57.42	1.35	0.11	57.10	1.30	0.25	58.98	2.06	0.02	58.74	1.57	0.03
58.69	10.180	0.230	58.42	8.361	0.265	58.10	3.950	0.250	59.55	2.215	0.066	59.76	0.980	0.023
59.40	8.77	0.34	59.43	6.18	0.23	59.10	4.96	0.25	0.0	0.0	0.0	60.39	1.21	0.05
0.0	0.0	0.0	60.28	9.765	0.342	60.09	1.640	0.250	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	60.77	3.500	0.250	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 16 (cont.)

PROTON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

40 DEG - RUN 2035			45 DEG - RUN 7101			50 DEG - RUN 2040			55 DEG - RUN 2043			60 DEG - RUN 104		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
3.36	7.01	0.09	3.62	5.82	0.06	3.22	2.86	0.05	2.07	4.04	0.06	2.93	5.37	0.10
3.76	6.37	0.08	4.02	6.13	0.06	3.61	5.16	0.07	2.47	4.27	0.06	3.34	5.72	0.10
4.16	5.98	0.08	4.42	5.91	0.06	4.01	5.59	0.07	2.87	4.51	0.07	3.74	5.06	0.09
4.56	5.55	0.08	4.82	5.45	0.06	4.41	5.28	0.07	3.27	5.23	0.07	4.14	4.54	0.09
4.96	5.41	0.08	5.22	5.46	0.06	4.81	4.95	0.07	3.67	5.56	0.07	4.54	4.51	0.09
5.36	5.16	0.08	5.62	4.81	0.06	5.21	4.67	0.07	4.07	5.25	0.07	4.94	4.10	0.08
5.75	4.65	0.07	6.02	4.55	0.05	5.61	4.44	0.06	4.47	4.88	0.07	5.34	3.76	0.08
6.15	4.38	0.07	6.41	4.28	0.05	6.01	4.01	0.06	4.87	4.80	0.07	5.74	3.81	0.08
6.55	4.33	0.07	7.11	3.88	0.03	6.41	3.77	0.06	5.27	4.54	0.07	6.15	3.29	0.08
7.25	3.95	0.04	8.11	3.42	0.03	7.11	3.58	0.04	5.66	4.08	0.06	6.55	3.02	0.07
8.25	3.58	0.04	9.11	3.32	0.03	8.10	3.15	0.03	6.06	3.79	0.06	7.25	2.69	0.04
9.24	2.78	0.04	10.11	2.56	0.03	9.10	2.59	0.03	6.46	3.55	0.06	8.25	2.40	0.04
10.24	2.35	0.03	11.11	2.16	0.02	10.10	2.00	0.03	7.16	3.35	0.04	9.26	1.70	0.03
11.23	2.24	0.03	12.11	1.93	0.02	11.09	1.92	0.03	8.16	2.98	0.03	10.26	1.69	0.03
12.23	2.07	0.03	13.10	1.79	0.02	12.09	1.75	0.03	9.16	2.35	0.03	11.26	1.50	0.03
13.23	1.92	0.03	14.10	1.65	0.02	13.09	1.59	0.02	10.16	1.94	0.03	12.27	1.34	0.03
14.22	1.88	0.03	15.10	1.66	0.02	14.09	1.54	0.02	11.15	1.73	0.03	13.27	1.15	0.03
15.22	1.79	0.03	16.10	1.58	0.02	15.08	1.45	0.02	12.15	1.57	0.02	14.27	1.13	0.03
16.22	1.63	0.03	17.10	1.56	0.02	16.08	1.34	0.02	13.15	1.51	0.02	15.27	1.07	0.03
17.21	1.73	0.03	18.10	1.49	0.02	17.08	1.35	0.02	14.15	1.37	0.02	16.28	1.04	0.03
18.21	1.67	0.03	19.09	1.51	0.02	18.07	1.32	0.02	15.15	1.29	0.02	17.28	0.99	0.03
19.21	1.662	0.027	20.09	1.511	0.020	19.07	1.296	0.022	16.15	1.255	0.022	18.28	0.889	0.025
20.20	1.616	0.027	21.09	1.461	0.019	20.07	1.216	0.021	17.14	1.184	0.021	19.29	0.888	0.025
21.20	1.56	0.03	22.09	1.48	0.02	21.07	1.21	0.02	18.14	1.15	0.02	20.29	0.92	0.03
22.19	1.647	0.027	23.09	1.467	0.019	22.06	1.207	0.021	19.14	1.108	0.020	21.29	0.848	0.024
23.19	1.544	0.026	24.09	1.449	0.019	23.06	1.226	0.022	20.14	1.083	0.020	22.30	0.817	0.024
24.19	1.537	0.026	25.08	1.484	0.019	24.06	1.160	0.021	21.14	1.011	0.019	23.30	0.804	0.024
25.18	1.573	0.026	26.08	1.444	0.019	25.05	1.171	0.021	22.14	1.091	0.020	24.30	0.783	0.023
26.18	1.473	0.026	27.08	1.409	0.019	26.05	1.138	0.021	23.13	1.027	0.020	25.31	0.753	0.023
27.18	1.478	0.026	28.08	1.437	0.019	27.05	1.054	0.020	24.13	0.996	0.019	26.31	0.742	0.023
28.17	1.507	0.026	29.08	1.413	0.019	28.05	1.059	0.020	25.13	0.931	0.019	27.31	0.727	0.022
29.17	1.526	0.026	30.08	1.384	0.019	29.04	1.028	0.020	26.13	0.966	0.019	28.32	0.706	0.022
30.17	1.476	0.026	31.08	1.338	0.018	30.04	1.063	0.020	27.13	0.927	0.019	29.32	0.666	0.022
31.16	1.509	0.026	32.07	1.362	0.019	31.04	1.007	0.020	28.12	0.912	0.019	30.32	0.630	0.021
32.16	1.453	0.025	33.07	1.348	0.018	32.04	1.032	0.020	29.12	0.867	0.018	31.33	0.651	0.021
33.16	1.480	0.026	34.07	1.356	0.019	33.03	0.999	0.019	30.12	0.849	0.018	32.33	0.649	0.021
34.15	1.468	0.025	35.07	1.306	0.018	34.03	1.013	0.020	31.12	0.830	0.018	33.33	0.647	0.021
35.15	1.464	0.025	36.07	1.357	0.019	35.03	0.976	0.019	32.12	0.800	0.017	34.34	0.589	0.020
36.14	1.477	0.026	37.07	1.360	0.019	36.02	0.951	0.019	33.12	0.799	0.017	35.34	0.588	0.020
37.14	1.441	0.025	38.06	1.338	0.018	37.02	0.917	0.019	34.11	0.791	0.017	36.34	0.542	0.019
38.14	1.510	0.026	39.06	1.356	0.019	38.02	0.898	0.018	35.11	0.781	0.017	37.35	0.564	0.020
39.13	1.532	0.026	40.06	1.281	0.018	39.02	0.979	0.019	36.11	0.780	0.017	38.35	0.543	0.019
40.13	1.531	0.026	41.06	1.219	0.018	40.01	0.878	0.018	37.11	0.736	0.017	39.35	0.476	0.018
41.13	1.535	0.026	42.06	1.195	0.017	41.01	0.898	0.018	38.11	0.730	0.017	40.36	0.505	0.019
42.12	1.476	0.026	43.06	1.162	0.017	42.01	0.874	0.018	39.10	0.707	0.016	41.36	0.493	0.019
43.12	1.428	0.025	44.05	1.192	0.017	43.00	0.851	0.018	40.10	0.671	0.016	42.36	0.468	0.018
44.12	1.374	0.025	45.05	1.074	0.016	44.00	0.845	0.018	41.10	0.676	0.016	43.37	0.492	0.019
45.11	1.420	0.025	46.05	1.064	0.016	45.00	0.791	0.017	42.10	0.671	0.016	44.37	0.436	0.017
46.11	1.334	0.024	47.05	1.026	0.016	46.00	0.738	0.017	43.10	0.611	0.015	45.37	0.405	0.017
47.10	1.249	0.024	48.05	0.998	0.016	46.99	0.711	0.016	44.10	0.655	0.016	46.38	0.365	0.016
48.10	1.271	0.024	49.05	1.090	0.017	47.99	0.681	0.016	45.09	0.552	0.014	47.38	0.404	0.017
49.10	1.247	0.023	50.04	0.873	0.015	48.99	0.646	0.016	46.09	0.546	0.014	48.38	0.351	0.016
50.09	1.301	0.024	51.04	0.870	0.015	49.98	0.709	0.016	47.09	0.539	0.014	49.39	0.374	0.016
51.09	1.204	0.023	52.04	1.500	0.019	50.98	0.527	0.014	48.09	0.509	0.014	50.39	0.348	0.016
52.09	1.018	0.021	53.04	0.696	0.013	51.98	0.580	0.015	49.09	0.469	0.013	51.39	0.299	0.014
53.08	1.373	0.025	54.04	0.498	0.011	52.98	0.741	0.017	50.08	0.493	0.014	52.40	0.429	0.017
54.08	1.489	0.026	55.04	0.843	0.015	53.97	0.391	0.012	51.08	0.434	0.013	53.40	0.162	0.011
55.08	0.637	0.017	56.04	0.328	0.009	54.97	0.376	0.012	52.08	0.387	0.012	54.40	0.322	0.015
56.07	0.925	0.020	57.03	1.013	0.016	55.97	0.465	0.013	53.08	0.522	0.014	55.41	0.076	0.007
57.07	0.264	0.011	58.03	0.171	0.007	56.97	0.539	0.014	54.08	0.202	0.009	56.41	0.356	0.016
58.07	0.931	0.020	58.76	0.877	0.022	57.96	0.590	0.015	55.08	0.419	0.013	57.41	0.278	0.014
59.06	0.501	0.015	0.0	0.0	0.0	58.96	0.280	0.010	56.07	0.106	0.006	58.32	0.217	0.014
59.88	0.584	0.020	0.0	0.0	0.0	59.63	0.217	0.015	57.07	0.509	0.014	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.07	0.312	0.011	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.99	0.295	0.011	0.0	0.0	0.0

TABLE 16 (cont.)

PROTON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

65 DEG - RUN 2046			70 DEG - RUN 2030			75 DEG - RUN 2021			82 DEG - RUN 2025			90 DEG - RUN 110		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
2.07	5.23	0.07	3.22	6.38	0.07	3.24	6.31	0.05	3.25	6.17	0.05	2.79	4.91	0.07
2.47	5.48	0.07	3.62	5.40	0.07	3.65	5.55	0.04	3.65	5.29	0.05	3.19	5.47	0.07
2.87	5.78	0.07	4.02	5.07	0.07	4.05	4.95	0.04	4.04	4.76	0.05	3.60	4.46	0.06
3.27	6.30	0.08	4.42	4.66	0.06	4.45	4.65	0.04	4.44	4.55	0.04	4.00	4.16	0.06
3.67	5.41	0.07	4.82	4.50	0.06	4.85	4.28	0.04	4.84	4.18	0.04	4.40	3.97	0.06
4.07	5.12	0.07	5.22	4.11	0.06	5.25	3.98	0.04	5.23	3.76	0.04	4.80	3.69	0.06
4.47	4.78	0.07	5.61	3.79	0.06	5.66	3.60	0.03	5.63	3.46	0.04	5.21	3.25	0.05
4.87	4.41	0.06	6.01	3.55	0.06	6.06	3.35	0.03	6.03	3.30	0.04	5.61	3.02	0.05
5.27	4.10	0.06	6.41	3.30	0.05	6.46	3.13	0.03	6.43	3.10	0.04	6.01	2.73	0.05
5.67	3.83	0.06	7.11	2.96	0.03	7.17	2.75	0.02	7.12	2.67	0.02	6.41	2.56	0.05
6.07	3.56	0.06	8.11	2.58	0.03	8.17	2.47	0.02	8.11	2.34	0.02	7.12	2.22	0.03
6.47	3.37	0.06	9.11	2.01	0.03	9.18	1.71	0.01	9.11	1.75	0.02	8.13	1.89	0.03
7.16	2.968	0.033	10.11	1.544	0.023	10.18	1.452	0.014	10.10	1.355	0.015	9.13	1.382	0.022
8.16	2.616	0.031	11.10	1.426	0.022	11.19	1.249	0.013	11.09	1.253	0.015	10.14	1.318	0.021
9.16	2.103	0.028	12.10	1.278	0.021	12.19	1.146	0.012	12.08	1.098	0.014	11.14	1.087	0.019
10.16	1.708	0.025	13.10	1.158	0.020	13.20	1.018	0.012	13.07	0.973	0.013	12.15	0.908	0.018
11.16	1.518	0.023	14.10	1.059	0.019	14.20	0.948	0.011	14.07	0.879	0.012	13.16	0.807	0.017
12.16	1.365	0.022	15.10	0.991	0.019	15.21	0.862	0.011	15.06	0.798	0.012	14.16	0.738	0.016
13.16	1.256	0.021	16.10	0.920	0.018	16.22	0.833	0.010	16.05	0.737	0.011	15.17	0.652	0.015
14.15	1.143	0.020	17.09	0.895	0.018	17.22	0.754	0.010	17.04	0.695	0.011	16.18	0.598	0.014
15.15	1.092	0.020	18.09	0.821	0.017	18.23	0.687	0.009	18.04	0.622	0.010	17.18	0.532	0.014
16.15	0.994	0.019	19.09	0.787	0.017	19.23	0.687	0.009	19.03	0.612	0.010	18.19	0.485	0.013
17.15	1.002	0.019	20.09	0.737	0.016	20.24	0.623	0.009	20.02	0.556	0.010	19.19	0.464	0.013
18.15	0.932	0.018	21.09	0.708	0.016	21.24	0.602	0.009	21.01	0.523	0.010	20.20	0.421	0.012
19.15	0.888	0.018	22.08	0.713	0.016	22.25	0.563	0.009	22.01	0.493	0.009	21.21	0.370	0.011
20.15	0.845	0.017	23.08	0.671	0.015	23.25	0.549	0.008	23.00	0.470	0.009	22.21	0.359	0.011
21.14	0.853	0.018	24.08	0.635	0.015	24.26	0.505	0.008	23.99	0.441	0.009	23.22	0.332	0.011
22.14	0.759	0.017	25.08	0.595	0.014	25.27	0.489	0.008	24.98	0.427	0.009	24.23	0.328	0.011
23.14	0.753	0.016	26.08	0.585	0.014	26.27	0.472	0.008	25.98	0.381	0.008	25.23	0.286	0.010
24.14	0.700	0.016	27.08	0.575	0.014	27.28	0.439	0.008	26.97	0.358	0.008	26.24	0.287	0.010
25.14	0.719	0.016	28.07	0.525	0.014	28.28	0.427	0.007	27.96	0.348	0.008	27.24	0.257	0.009
26.14	0.664	0.015	29.07	0.513	0.013	29.29	0.408	0.007	28.95	0.328	0.008	28.25	0.235	0.009
27.14	0.668	0.016	30.07	0.475	0.013	30.29	0.385	0.007	29.95	0.301	0.007	29.26	0.238	0.009
28.13	0.630	0.015	31.07	0.463	0.013	31.30	0.371	0.007	30.94	0.300	0.007	30.26	0.202	0.008
29.13	0.608	0.015	32.07	0.454	0.013	32.31	0.351	0.007	31.93	0.282	0.007	31.27	0.189	0.008
30.13	0.564	0.014	33.06	0.448	0.013	33.31	0.330	0.007	32.92	0.259	0.007	32.28	0.184	0.008
31.13	0.557	0.014	34.06	0.408	0.012	34.32	0.315	0.006	33.92	0.255	0.007	33.28	0.179	0.008
32.13	0.570	0.014	35.06	0.404	0.012	35.32	0.311	0.006	34.91	0.233	0.006	34.29	0.161	0.007
33.13	0.530	0.014	36.06	0.375	0.011	36.33	0.290	0.006	35.90	0.223	0.006	35.29	0.154	0.007
34.13	0.521	0.014	37.06	0.379	0.012	37.33	0.283	0.006	36.89	0.216	0.006	36.30	0.138	0.007
35.13	0.472	0.013	38.05	0.382	0.012	38.34	0.273	0.006	37.88	0.191	0.006	37.31	0.125	0.007
36.12	0.499	0.013	39.05	0.313	0.010	39.34	0.252	0.006	38.88	0.187	0.006	38.31	0.117	0.006
37.12	0.464	0.013	40.05	0.328	0.011	40.35	0.244	0.006	39.87	0.174	0.006	39.32	0.115	0.006
38.12	0.472	0.013	41.05	0.318	0.011	41.36	0.222	0.005	40.86	0.155	0.005	40.33	0.095	0.006
39.12	0.422	0.012	42.05	0.277	0.010	42.36	0.206	0.005	41.85	0.151	0.005	41.33	0.090	0.006
40.12	0.431	0.012	43.05	0.300	0.010	43.37	0.196	0.005	42.85	0.146	0.005	42.34	0.086	0.005
41.12	0.381	0.012	44.04	0.271	0.010	44.37	0.159	0.005	43.84	0.117	0.005	43.34	0.068	0.005
42.12	0.393	0.012	45.04	0.227	0.009	45.38	0.167	0.005	44.83	0.112	0.004	44.35	0.061	0.005
43.11	0.365	0.011	46.04	0.214	0.009	46.38	0.167	0.005	45.82	0.105	0.004	45.36	0.058	0.004
44.11	0.368	0.012	47.04	0.223	0.009	47.39	0.138	0.004	46.82	0.096	0.004	46.36	0.051	0.004
45.11	0.326	0.011	48.04	0.205	0.008	48.40	0.149	0.004	47.81	0.085	0.004	47.37	0.046	0.004
46.11	0.320	0.011	49.03	0.194	0.008	49.40	0.110	0.004	48.80	0.070	0.004	48.37	0.036	0.004
47.11	0.298	0.010	50.03	0.170	0.008	50.41	0.116	0.004	49.79	0.074	0.004	49.38	0.037	0.004
48.11	0.285	0.010	51.03	0.155	0.007	51.41	0.125	0.004	50.79	0.080	0.004	50.39	0.039	0.004
49.11	0.273	0.010	52.03	0.192	0.008	52.42	0.052	0.003	51.78	0.042	0.003	51.39	0.018	0.002
50.10	0.232	0.009	53.03	0.067	0.005	53.42	0.073	0.003	52.77	0.042	0.003	52.40	0.018	0.003
51.10	0.233	0.009	54.03	0.142	0.007	54.43	0.060	0.003	53.76	0.038	0.003	53.41	0.004	0.001
52.10	0.272	0.010	55.02	0.043	0.004	55.43	0.096	0.004	54.76	0.059	0.003	54.41	0.058	0.004
53.10	0.124	0.007	56.02	0.120	0.006	56.44	0.102	0.004	55.75	0.082	0.004	55.42	0.016	0.002
54.10	0.159	0.008	57.02	0.123	0.007	57.45	0.061	0.003	56.74	0.035	0.002	56.25	0.034	0.004
55.10	0.165	0.008	57.97	0.075	0.005	57.97	0.035	0.010	57.36	0.024	0.004	0.0	0.0	0.0
56.10	0.177	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
57.09	0.165	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58.09	0.092	0.006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
58.64	0.035	0.011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 16 (cont.)

PROTON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

110 DEG - RUN 107			160 DEG - RUN 2066											
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
2.59	5.18	0.06	3.09	5.59	0.12									
2.99	5.47	0.06	3.49	5.32	0.12									
3.39	5.03	C.06	3.90	4.49	0.11									
3.80	4.45	0.06	4.31	4.24	0.11									
4.20	4.12	0.05	4.72	3.61	0.10									
4.60	3.71	0.05	5.13	3.09	0.09									
5.00	3.46	0.05	5.54	2.90	0.09									
5.41	3.09	0.05	5.94	2.65	0.09									
5.81	2.81	0.04	6.35	2.47	0.08									
6.21	2.59	0.04	6.76	2.27	0.08									
6.61	2.30	0.04	7.47	1.91	0.05									
7.32	2.00	0.02	8.49	1.61	0.04									
8.32	1.71	0.02	9.52	1.14	0.04									
9.33	1.21	0.02	10.54	0.93	0.03									
10.33	1.11	0.02	11.56	0.81	0.03									
11.34	0.93	0.02	12.58	0.67	0.03									
12.35	0.76	0.01	13.60	0.63	0.03									
13.35	0.662	0.014	14.62	0.510	0.024									
14.36	0.597	0.013	15.64	0.422	0.022									
15.36	0.502	0.012	16.66	0.387	0.021									
16.37	0.465	0.011	17.68	0.332	0.019									
17.38	0.400	0.011	18.70	0.290	0.018									
18.38	0.343	0.010	19.72	0.248	0.017									
19.39	0.332	0.010	20.74	0.229	0.016									
20.39	0.301	0.009	21.76	0.211	0.015									
21.40	0.274	0.009	22.78	0.175	0.014									
22.41	0.244	0.008	23.80	0.141	0.012									
23.41	0.214	0.008	24.82	0.126	0.012									
24.42	0.199	0.007	25.84	0.112	0.011									
25.42	0.176	0.007	26.86	0.095	0.010									
26.43	0.180	0.007	27.88	0.084	0.010									
27.43	0.163	0.007	28.90	0.086	0.010									
28.44	0.144	0.006	29.92	0.064	0.008									
29.45	0.127	0.006	30.94	0.054	0.008									
30.45	0.116	0.006	31.96	0.044	0.007									
31.46	0.101	0.005	32.98	0.050	0.007									
32.46	0.100	0.005	34.00	0.030	0.006									
33.47	0.091	0.005	35.03	0.019	0.005									
34.48	0.080	0.005	36.05	0.031	0.006									
35.48	0.067	0.004	37.07	0.024	0.005									
36.49	0.052	0.004	38.09	0.027	0.005									
37.49	0.053	0.004	39.11	0.020	0.005									
38.50	0.047	0.004	40.13	0.022	0.005									
39.50	0.039	0.003	41.15	0.013	0.004									
40.51	0.041	0.003	42.17	0.017	0.004									
41.52	0.033	0.003	43.19	0.012	0.004									
42.52	0.028	0.003	44.21	0.008	0.003									
43.53	0.025	0.003	45.23	0.005	0.002									
44.53	0.024	0.003	46.25	0.007	0.003									
45.54	0.018	0.002	47.27	0.006	0.003									
46.55	0.017	0.002	48.29	0.0	0.0									
47.55	0.012	0.002	49.31	0.001	0.001									
48.56	0.012	0.002	50.33	0.002	0.002									
49.56	0.007	0.001	51.35	0.0	0.0									
50.57	0.011	0.002	52.37	0.001	0.001									
51.57	0.007	0.001	53.39	0.004	0.002									
52.58	0.007	0.001	53.95	0.0	0.0									
53.59	0.009	0.002	0.0	0.0	0.0									
54.59	0.005	0.001	0.0	0.0	0.0									
55.15	0.0	0.0	0.0	0.0	0.0									

DEUTERON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

12 DEG - RUN 117			15 DEG - RUN 116			25 DEG - RUN 2047			30 DEG - RUN 7106			35 DEG - RUN 2004		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
2.85	0.284	0.061	2.64	0.278	0.076	3.02	0.636	0.044	3.01	0.315	0.015	3.01	0.305	0.020
3.25	0.344	0.067	3.04	0.429	0.095	3.41	0.528	0.041	3.41	0.347	0.016	3.41	0.336	0.021
3.65	0.384	0.071	3.45	0.631	0.115	3.81	0.481	0.039	3.81	0.469	0.019	3.82	0.436	0.024
4.05	0.555	0.085	3.85	0.485	0.101	4.21	0.592	0.043	4.21	0.520	0.020	4.22	0.453	0.025
4.46	0.33	0.07	4.25	0.62	0.11	4.61	0.58	0.04	4.61	0.48	0.02	4.62	0.47	0.03
4.86	0.34	0.07	4.65	0.39	0.09	5.01	0.57	0.04	5.00	0.57	0.02	5.03	0.50	0.03
5.26	0.433	0.075	5.05	0.728	0.124	5.41	0.536	0.041	5.40	0.507	0.019	5.43	0.430	0.024
5.67	0.56	0.09	5.46	0.34	0.08	5.81	0.59	0.04	5.80	0.55	0.02	5.84	0.46	0.03
6.07	0.37	0.07	5.86	0.56	0.11	6.21	0.52	0.04	6.20	0.51	0.02	6.24	0.52	0.03
6.47	0.56	0.09	6.26	0.59	0.11	6.60	0.56	0.04	6.60	0.53	0.02	6.65	0.48	0.03
7.18	0.569	0.054	6.66	0.394	0.091	7.30	0.494	0.025	7.29	0.493	0.012	7.35	0.420	0.015
8.18	0.445	0.048	7.37	0.415	0.059	8.30	0.473	0.024	8.29	0.458	0.012	8.36	0.433	0.015
9.19	0.460	0.049	8.37	0.493	0.064	9.30	0.491	0.025	9.29	0.445	0.011	9.37	0.396	0.015
10.20	0.498	0.051	9.38	0.534	0.067	10.29	0.477	0.024	10.28	0.434	0.011	10.38	0.392	0.015
11.21	0.439	0.048	10.39	0.421	0.059	11.29	0.449	0.024	11.28	0.420	0.011	11.40	0.424	0.015
12.21	0.380	0.045	11.39	0.354	0.054	12.29	0.359	0.021	12.27	0.388	0.011	12.41	0.239	0.011
13.22	0.524	0.052	12.40	0.400	0.058	13.28	0.317	0.020	13.27	0.396	0.011	13.42	0.314	0.013
14.23	0.439	0.048	13.40	0.416	0.059	14.28	0.319	0.020	14.26	0.356	0.010	14.43	0.330	0.013
15.23	0.505	0.051	14.41	0.332	0.053	15.28	0.313	0.020	15.26	0.335	0.010	15.44	0.308	0.013
16.24	0.329	0.041	15.42	0.393	0.057	16.28	0.294	0.019	16.26	0.342	0.010	16.45	0.294	0.013
17.25	0.383	0.045	16.42	0.369	0.056	17.27	0.355	0.021	17.25	0.315	0.010	17.46	0.293	0.013
18.26	0.388	0.045	17.43	0.338	0.053	18.27	0.324	0.020	18.25	0.327	0.010	18.47	0.296	0.013
19.26	0.441	0.048	18.43	0.481	0.064	19.27	0.315	0.020	19.24	0.331	0.010	19.48	0.291	0.013
20.27	0.429	0.047	19.44	0.390	0.057	20.26	0.339	0.021	20.24	0.338	0.010	20.49	0.308	0.013
21.28	0.432	0.047	20.45	0.398	0.058	21.26	0.339	0.021	21.24	0.349	0.010	21.50	0.277	0.012
22.28	0.359	0.043	21.45	0.399	0.058	22.26	0.361	0.021	22.23	0.350	0.010	22.51	0.300	0.013
23.29	0.472	0.050	22.46	0.410	0.059	23.25	0.327	0.020	23.23	0.346	0.010	23.52	0.284	0.012
24.30	0.451	0.048	23.46	0.388	0.057	24.25	0.355	0.021	24.22	0.357	0.010	24.53	0.303	0.013
25.31	0.370	0.044	24.47	0.336	0.053	25.25	0.410	0.023	25.22	0.341	0.010	25.54	0.306	0.013
26.31	0.409	0.046	25.48	0.462	0.062	26.24	0.385	0.022	26.21	0.366	0.010	26.56	0.301	0.013
27.32	0.541	0.053	26.48	0.550	0.068	27.24	0.356	0.021	27.21	0.355	0.010	27.57	0.261	0.012
28.33	0.490	0.051	27.49	0.445	0.061	28.24	0.362	0.021	28.21	0.331	0.010	28.58	0.286	0.013
29.33	0.470	0.049	28.49	0.498	0.065	29.24	0.341	0.021	29.20	0.330	0.010	29.59	0.279	0.012
30.34	0.549	0.053	29.50	0.468	0.063	30.23	0.365	0.021	30.20	0.333	0.010	30.60	0.277	0.012
31.35	0.714	0.061	30.51	0.377	0.056	31.23	0.366	0.021	31.19	0.315	0.010	31.61	0.261	0.012
32.36	0.605	0.056	31.51	0.544	0.068	32.23	0.335	0.021	32.19	0.319	0.010	32.62	0.267	0.012
33.36	0.526	0.052	32.52	0.422	0.059	33.22	0.297	0.019	33.19	0.326	0.010	33.63	0.279	0.012
34.37	0.653	0.058	33.52	0.498	0.065	34.22	0.380	0.022	34.18	0.320	0.010	34.64	0.285	0.013
35.38	0.657	0.058	34.53	0.528	0.067	35.22	0.336	0.021	35.18	0.331	0.010	35.65	0.241	0.012
36.39	0.613	0.057	35.54	0.642	0.073	36.21	0.323	0.020	36.17	0.312	0.010	36.66	0.281	0.012
37.39	0.679	0.059	36.54	0.587	0.070	37.21	0.344	0.021	37.17	0.342	0.010	37.67	0.289	0.013
38.40	0.923	0.069	37.55	0.473	0.063	38.21	0.337	0.021	38.16	0.310	0.010	38.68	0.262	0.012
39.41	0.782	0.064	38.55	0.613	0.072	39.20	0.323	0.020	39.16	0.428	0.011	39.69	0.359	0.014
40.41	1.420	0.086	39.56	0.545	0.068	40.20	0.395	0.022	40.16	0.410	0.011	40.70	0.334	0.014
41.42	1.438	0.087	40.57	1.143	0.098	41.20	0.507	0.025	41.15	0.623	0.014	41.71	0.489	0.016
42.43	1.736	0.095	41.57	1.159	0.099	42.20	0.663	0.029	42.15	0.392	0.011	42.73	0.330	0.013
43.44	1.261	0.081	42.58	1.442	0.110	43.19	0.452	0.024	43.14	0.422	0.011	43.74	0.359	0.014
44.44	1.353	0.084	43.58	0.839	0.084	44.19	0.507	0.025	44.14	1.114	0.018	44.75	0.913	0.022
45.45	3.302	0.131	44.59	1.210	0.101	45.19	1.195	0.039	45.13	0.537	0.013	45.76	0.417	0.015
46.46	1.460	0.087	45.60	3.513	0.172	46.18	0.743	0.031	46.13	0.661	0.014	46.77	0.557	0.018
47.46	2.208	0.107	46.60	1.402	0.108	47.18	0.510	0.025	47.13	0.617	0.013	47.78	0.516	0.017
48.47	2.034	0.103	47.61	2.464	0.144	48.18	1.105	0.037	48.12	0.507	0.012	48.79	0.415	0.015
49.48	2.473	0.113	48.61	1.624	0.117	49.17	0.517	0.025	49.12	1.209	0.019	49.80	0.963	0.023
50.49	3.079	0.127	49.62	2.739	0.152	50.17	1.552	0.044	49.72	0.007	0.003	50.56	0.010	0.003
51.01	0.0	0.0	50.62	2.000	0.130	50.84	0.011	0.006	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	51.33	0.025	0.023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 17

TABLE 17 (cont.)

DEUTERON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

40 DEG - RUN 2035			45 DEG - RUN 7101			50 DEG - RUN 2040			55 DEG - RUN 2043			60 DEG - RUN 104		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
3.11	0.393	0.021	2.97	0.312	0.014	2.97	0.131	0.011	3.12	0.239	0.015	2.63	0.241	0.020
3.51	0.392	0.021	3.37	0.389	0.016	3.37	0.144	0.012	3.52	0.265	0.016	3.03	0.315	0.023
3.91	0.427	0.022	3.77	0.450	0.017	3.76	0.164	0.013	3.92	0.322	0.017	3.44	0.345	0.024
4.31	0.49	0.02	4.17	0.56	0.02	4.16	0.16	0.01	4.32	0.40	0.02	3.84	0.39	0.03
4.71	0.52	0.02	4.57	0.46	0.02	4.56	0.33	0.02	4.72	0.45	0.02	4.24	0.40	0.03
5.11	0.50	0.02	4.97	0.43	0.02	4.96	0.45	0.02	5.12	0.39	0.02	4.64	0.40	0.03
5.51	0.47	0.02	5.37	0.48	0.02	5.36	0.45	0.02	5.52	0.40	0.02	5.04	0.36	0.03
5.90	0.478	0.023	5.77	0.455	0.017	5.76	0.442	0.021	5.91	0.410	0.020	5.44	0.350	0.025
6.30	0.498	0.023	6.17	0.484	0.018	6.16	0.445	0.021	6.31	0.392	0.019	5.84	0.335	0.024
6.70	0.474	0.023	6.56	0.471	0.017	6.56	0.408	0.020	6.71	0.369	0.019	6.25	0.312	0.023
7.40	0.451	0.014	7.26	0.457	0.011	7.25	0.407	0.012	7.41	0.365	0.012	6.65	0.352	0.025
8.39	0.407	0.013	8.26	0.420	0.010	8.25	0.358	0.012	8.41	0.343	0.011	7.35	0.323	0.015
9.39	0.405	0.013	9.26	0.404	0.010	9.25	0.358	0.012	9.41	0.311	0.011	8.35	0.291	0.014
10.39	0.422	0.014	10.26	0.374	0.010	10.25	0.337	0.011	10.41	0.307	0.011	9.36	0.265	0.014
11.38	0.355	0.013	11.26	0.360	0.010	11.24	0.332	0.011	11.40	0.277	0.010	10.36	0.234	0.013
12.38	0.295	0.011	12.26	0.322	0.009	12.24	0.252	0.010	12.40	0.224	0.009	11.36	0.227	0.013
13.38	0.269	0.011	13.25	0.352	0.009	13.24	0.225	0.009	13.40	0.217	0.009	12.37	0.178	0.011
14.37	0.249	0.010	14.25	0.295	0.009	14.24	0.201	0.009	14.40	0.195	0.009	13.37	0.195	0.012
15.37	0.247	0.010	15.25	0.284	0.008	15.23	0.220	0.009	15.40	0.190	0.008	14.37	0.192	0.012
16.37	0.263	0.011	16.25	0.255	0.008	16.23	0.211	0.009	16.40	0.182	0.008	15.38	0.176	0.011
17.36	0.243	0.010	17.25	0.253	0.008	17.23	0.201	0.009	17.39	0.181	0.008	16.38	0.191	0.012
18.36	0.251	0.011	18.25	0.256	0.008	18.22	0.200	0.009	18.39	0.174	0.008	17.38	0.138	0.010
19.36	0.244	0.010	19.24	0.252	0.008	19.22	0.204	0.009	19.39	0.165	0.008	18.39	0.147	0.010
20.35	0.248	0.010	20.24	0.253	0.008	20.22	0.184	0.008	20.39	0.185	0.008	19.39	0.161	0.011
21.35	0.239	0.010	21.24	0.247	0.008	21.22	0.189	0.008	21.39	0.171	0.008	20.39	0.139	0.010
22.34	0.259	0.011	22.24	0.241	0.008	22.21	0.192	0.009	22.38	0.159	0.008	21.39	0.140	0.010
23.34	0.238	0.010	23.24	0.239	0.008	23.21	0.179	0.008	23.38	0.144	0.007	22.40	0.145	0.010
24.34	0.229	0.010	24.24	0.234	0.008	24.21	0.184	0.008	24.38	0.162	0.008	23.40	0.145	0.010
25.33	0.229	0.010	25.23	0.244	0.008	25.20	0.161	0.008	25.38	0.157	0.008	24.40	0.121	0.009
26.33	0.258	0.011	26.23	0.222	0.008	26.20	0.150	0.008	26.38	0.136	0.007	25.41	0.115	0.009
27.33	0.241	0.010	27.23	0.237	0.008	27.20	0.177	0.008	27.38	0.140	0.007	26.41	0.118	0.009
28.32	0.227	0.010	28.23	0.229	0.008	28.20	0.172	0.008	28.37	0.144	0.007	27.41	0.118	0.009
29.32	0.213	0.010	29.23	0.216	0.007	29.19	0.163	0.008	29.37	0.151	0.008	28.42	0.117	0.009
30.32	0.220	0.010	30.23	0.204	0.007	30.19	0.150	0.008	30.37	0.121	0.007	29.42	0.115	0.009
31.31	0.216	0.010	31.22	0.208	0.007	31.19	0.140	0.007	31.37	0.112	0.006	30.42	0.110	0.009
32.31	0.220	0.010	32.22	0.201	0.007	32.18	0.147	0.007	32.37	0.125	0.007	31.43	0.110	0.009
33.30	0.228	0.010	33.22	0.200	0.007	33.18	0.146	0.007	33.36	0.123	0.007	32.43	0.105	0.009
34.30	0.215	0.010	34.22	0.204	0.007	34.18	0.150	0.008	34.36	0.128	0.007	33.43	0.112	0.009
35.30	0.228	0.010	35.22	0.189	0.007	35.18	0.151	0.008	35.36	0.115	0.007	34.44	0.090	0.008
36.29	0.234	0.010	36.22	0.199	0.007	36.17	0.130	0.007	36.36	0.126	0.007	35.44	0.111	0.009
37.29	0.204	0.009	37.22	0.172	0.007	37.17	0.145	0.007	37.36	0.110	0.006	36.44	0.098	0.008
38.29	0.233	0.010	38.21	0.205	0.007	38.17	0.123	0.007	38.36	0.125	0.007	37.45	0.084	0.008
39.28	0.203	0.009	39.21	0.219	0.007	39.17	0.174	0.008	39.35	0.146	0.007	38.45	0.105	0.009
40.28	0.269	0.011	40.21	0.316	0.009	40.16	0.166	0.008	40.35	0.163	0.008	39.45	0.126	0.009
41.28	0.322	0.012	41.21	0.194	0.007	41.16	0.189	0.008	41.35	0.126	0.007	40.46	0.106	0.009
42.27	0.257	0.011	42.21	0.210	0.007	42.16	0.116	0.007	42.35	0.120	0.007	41.46	0.079	0.007
43.27	0.200	0.009	43.21	0.535	0.012	43.15	0.139	0.007	43.35	0.309	0.011	42.46	0.152	0.010
44.27	0.423	0.014	44.20	0.286	0.009	44.15	0.343	0.011	44.35	0.162	0.008	43.47	0.176	0.011
45.26	0.568	0.016	45.20	0.251	0.008	45.15	0.185	0.008	45.34	0.139	0.007	44.47	0.088	0.008
46.26	0.245	0.010	46.20	0.320	0.009	46.15	0.269	0.010	46.34	0.165	0.008	45.47	0.201	0.012
47.25	0.569	0.016	47.20	0.215	0.007	47.14	0.131	0.007	47.34	0.096	0.006	46.48	0.054	0.006
48.25	0.207	0.010	48.20	0.530	0.012	48.14	0.255	0.010	48.34	0.257	0.010	47.48	0.221	0.012
49.25	0.743	0.018	48.85	0.000	0.001	49.09	0.148	0.008	48.91	0.001	0.001	48.31	0.001	0.001
49.97	0.002	0.001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 17 (cont.)

DEUTERON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

65 DEG - RUN 2046			70 DEG - RUN 2030			75 DEG - RUN 2021			82 DEG - RUN 2025			90 DEG - RUN 110		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
2.97	0.307	0.017	3.02	0.295	0.016	3.04	0.308	0.010	3.05	0.306	0.012	2.29	0.205	0.013
3.37	0.364	0.018	3.42	0.345	0.017	3.44	0.341	0.011	3.45	0.344	0.012	2.69	0.244	0.015
3.77	0.364	0.018	3.82	0.400	0.019	3.85	0.380	0.011	3.85	0.367	0.013	3.09	0.266	0.015
4.17	0.404	0.019	4.22	0.428	0.019	4.25	0.427	0.012	4.24	0.411	0.013	3.50	0.313	0.016
4.57	0.434	0.020	4.62	0.348	0.017	4.65	0.392	0.011	4.64	0.467	0.014	3.90	0.341	0.017
4.97	0.411	0.019	5.02	0.388	0.018	5.05	0.360	0.011	5.04	0.416	0.014	4.30	0.302	0.016
5.37	0.381	0.019	5.42	0.375	0.018	5.46	0.361	0.011	5.43	0.341	0.012	4.70	0.308	0.016
5.77	0.391	0.019	5.81	0.377	0.018	5.86	0.345	0.011	5.83	0.326	0.012	5.11	0.267	0.015
6.17	0.360	0.018	6.21	0.342	0.017	6.26	0.329	0.010	6.23	0.303	0.012	5.51	0.270	0.015
6.57	0.332	0.017	6.61	0.334	0.017	6.66	0.322	0.010	6.62	0.298	0.011	5.91	0.255	0.015
7.26	0.340	0.011	7.31	0.315	0.011	7.37	0.298	0.006	7.32	0.281	0.007	6.31	0.278	0.016
8.26	0.294	0.010	8.31	0.266	0.010	8.37	0.255	0.006	8.31	0.241	0.007	6.72	0.251	0.015
9.26	0.279	0.010	9.31	0.244	0.009	9.38	0.237	0.006	9.30	0.216	0.006	7.42	0.214	0.009
10.26	0.257	0.010	10.31	0.245	0.009	10.38	0.232	0.005	10.30	0.198	0.006	8.43	0.185	0.008
11.26	0.241	0.009	11.30	0.235	0.009	11.39	0.225	0.005	11.29	0.192	0.006	9.43	0.160	0.007
12.26	0.188	0.008	12.30	0.181	0.008	12.39	0.133	0.004	12.28	0.128	0.005	10.44	0.145	0.007
13.26	0.153	0.007	13.30	0.154	0.007	13.40	0.125	0.004	13.27	0.122	0.005	11.45	0.147	0.007
14.25	0.151	0.007	14.30	0.148	0.007	14.41	0.116	0.004	14.27	0.112	0.004	12.45	0.107	0.006
15.25	0.155	0.007	15.30	0.130	0.007	15.41	0.117	0.004	15.26	0.106	0.004	13.46	0.107	0.006
16.25	0.146	0.007	16.29	0.132	0.007	16.42	0.108	0.004	16.25	0.101	0.004	14.46	0.100	0.006
17.25	0.141	0.007	17.29	0.132	0.007	17.42	0.106	0.004	17.24	0.091	0.004	15.47	0.087	0.006
18.25	0.134	0.007	18.29	0.134	0.007	18.43	0.105	0.004	18.24	0.077	0.004	16.48	0.075	0.005
19.25	0.133	0.007	19.29	0.114	0.006	19.43	0.095	0.004	19.23	0.081	0.004	17.48	0.068	0.005
20.25	0.125	0.007	20.29	0.103	0.006	20.44	0.093	0.003	20.22	0.081	0.004	18.49	0.072	0.005
21.24	0.121	0.007	21.29	0.103	0.006	21.44	0.084	0.003	21.21	0.076	0.004	19.50	0.068	0.005
22.24	0.116	0.006	22.28	0.100	0.006	22.45	0.079	0.003	22.20	0.070	0.004	20.50	0.071	0.005
23.24	0.130	0.007	23.28	0.103	0.006	23.46	0.084	0.003	23.20	0.071	0.004	21.51	0.065	0.005
24.24	0.119	0.007	24.28	0.097	0.006	24.46	0.079	0.003	24.19	0.059	0.003	22.51	0.058	0.005
25.24	0.108	0.006	25.28	0.097	0.006	25.47	0.069	0.003	25.18	0.055	0.003	23.52	0.040	0.004
26.24	0.097	0.006	26.28	0.082	0.005	26.47	0.069	0.003	26.17	0.057	0.003	24.53	0.033	0.003
27.24	0.099	0.006	27.27	0.082	0.005	27.48	0.064	0.003	27.17	0.055	0.003	25.53	0.049	0.004
28.23	0.096	0.006	28.27	0.083	0.005	28.48	0.063	0.003	28.16	0.050	0.003	26.54	0.040	0.004
29.23	0.095	0.006	29.27	0.086	0.005	29.49	0.057	0.003	29.15	0.044	0.003	27.55	0.034	0.003
30.23	0.082	0.005	30.27	0.076	0.005	30.50	0.053	0.003	30.14	0.040	0.003	28.55	0.035	0.004
31.23	0.078	0.005	31.27	0.068	0.005	31.50	0.059	0.003	31.14	0.043	0.003	29.56	0.033	0.003
32.23	0.082	0.005	32.27	0.072	0.005	32.51	0.050	0.003	32.13	0.038	0.003	30.56	0.028	0.003
33.23	0.070	0.005	33.26	0.061	0.005	33.51	0.046	0.002	33.12	0.035	0.002	31.57	0.031	0.003
34.23	0.078	0.005	34.26	0.060	0.005	34.52	0.045	0.002	34.11	0.038	0.003	32.58	0.025	0.003
35.22	0.064	0.005	35.26	0.066	0.005	35.52	0.042	0.002	35.11	0.033	0.002	33.58	0.019	0.003
36.22	0.078	0.005	36.26	0.052	0.004	36.53	0.039	0.002	36.10	0.033	0.002	34.59	0.017	0.002
37.22	0.074	0.005	37.26	0.064	0.005	37.53	0.050	0.003	37.09	0.035	0.003	35.60	0.022	0.003
38.22	0.085	0.006	38.25	0.054	0.004	38.54	0.052	0.003	38.08	0.035	0.002	36.60	0.021	0.003
39.22	0.092	0.006	39.25	0.066	0.005	39.55	0.043	0.002	39.08	0.030	0.002	37.61	0.025	0.003
40.22	0.084	0.006	40.25	0.050	0.004	40.55	0.038	0.002	40.07	0.025	0.002	38.61	0.012	0.002
41.22	0.056	0.004	41.25	0.056	0.004	41.56	0.077	0.003	41.06	0.060	0.003	39.62	0.014	0.002
42.21	0.099	0.006	42.25	0.104	0.006	42.56	0.046	0.002	42.05	0.028	0.002	40.63	0.031	0.003
43.21	0.151	0.007	43.25	0.061	0.005	43.57	0.033	0.002	43.05	0.027	0.002	41.63	0.015	0.002
44.21	0.073	0.005	44.24	0.063	0.005	44.57	0.044	0.002	44.04	0.025	0.002	42.64	0.024	0.003
45.21	0.124	0.007	45.24	0.052	0.004	45.58	0.030	0.002	45.03	0.022	0.002	43.65	0.004	0.001
46.21	0.040	0.004	46.24	0.053	0.004	46.59	0.053	0.003	46.00	0.037	0.003	44.65	0.025	0.003
47.21	0.140	0.007	47.24	0.066	0.005	47.41	0.000	0.000	0.0	0.0	0.0	45.56	0.0	0.0
48.03	0.0	0.0	47.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 17 (cont.)

DEUTERON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

110 DEG - RUN 107			160 DEG - RUN 2066								
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
2.44	0.27	0.01	2.63	0.30	0.03									
2.84	0.30	0.01	3.04	0.32	0.03									
3.24	0.31	0.01	3.44	0.37	0.03									
3.65	0.30	0.01	3.85	0.33	0.03									
4.05	0.37	0.02	4.26	0.34	0.03									
4.45	0.29	0.01	4.67	0.45	0.04									
4.85	0.28	0.01	5.08	0.42	0.03									
5.26	0.28	0.01	5.48	0.23	0.03									
5.66	0.24	0.01	5.89	0.24	0.03									
6.06	0.25	0.01	6.30	0.24	0.03									
6.46	0.253	0.013	6.71	0.201	0.024									
7.17	0.201	0.007	7.42	0.163	0.013									
8.17	0.182	0.007	8.44	0.152	0.013									
9.18	0.154	0.007	9.46	0.116	0.011									
10.18	0.131	0.006	10.48	0.091	0.010									
11.19	0.122	0.006	11.51	0.101	0.011									
12.20	0.088	0.005	12.53	0.072	0.009									
13.20	0.082	0.005	13.55	0.035	0.006									
14.21	0.079	0.005	14.57	0.037	0.006									
15.21	0.066	0.004	15.59	0.034	0.006									
16.22	0.062	0.004	16.61	0.034	0.006									
17.23	0.055	0.004	17.63	0.033	0.006									
18.23	0.052	0.004	18.65	0.019	0.005									
19.24	0.039	0.003	19.67	0.023	0.005									
20.24	0.032	0.003	20.69	0.012	0.004									
21.25	0.036	0.003	21.71	0.014	0.004									
22.25	0.032	0.003	22.73	0.013	0.004									
23.26	0.026	0.003	23.75	0.016	0.004									
24.27	0.024	0.003	24.77	0.007	0.003									
25.27	0.023	0.003	25.79	0.009	0.003									
26.28	0.021	0.002	26.81	0.002	0.002									
27.28	0.017	0.002	27.83	0.002	0.002									
28.29	0.018	0.002	28.85	0.002	0.002									
29.30	0.016	0.002	29.87	0.002	0.002									
30.30	0.013	0.002	30.89	0.003	0.002									
31.31	0.011	0.002	31.91	0.003	0.002									
32.31	0.010	0.002	32.93	0.001	0.001									
33.32	0.008	0.002	33.95	0.001	0.001									
34.32	0.012	0.002	34.97	0.002	0.002									
35.33	0.010	0.002	35.99	0.001	0.001									
36.34	0.009	0.002	37.01	0.0	0.0									
37.34	0.007	0.001	38.04	0.0	0.0									
38.35	0.009	0.002	39.06	0.001	0.001									
39.35	0.006	0.001	40.08	0.001	0.001									
40.36	0.005	0.001	41.10	0.0	0.0									
41.37	0.005	0.001	41.84	0.0	0.0									
42.37	0.005	0.001	0.0	0.0	0.0									
43.38	01001	0.001	0.0	0.0	0.0									
43.93	0.0	0.0	0.0	0.0	0.0									

TRITON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

12 DEG - RUN 117			15 DEG - RUN 116			25 DEG - RUN 2047			30 DEG - RUN 7106			35 DEG - RUN 2004		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
6.42	0.113	0.038	6.41	0.124	0.051	6.75	0.095	0.017	6.75	0.094	0.008	7.15	0.082	0.007
7.13	0.087	0.021	7.12	0.092	0.028	7.45	0.107	0.012	7.44	0.095	0.005	8.16	0.085	0.007
8.13	0.099	0.023	8.12	0.118	0.031	8.45	0.107	0.012	8.44	0.098	0.005	9.17	0.077	0.007
9.14	0.052	0.016	9.13	0.075	0.025	9.45	0.094	0.011	9.44	0.090	0.005	10.18	0.088	0.007
10.15	0.080	0.020	10.14	0.056	0.022	10.44	0.094	0.011	10.43	0.094	0.005	11.19	0.080	0.007
11.15	0.067	0.019	11.14	0.086	0.027	11.44	0.098	0.011	11.43	0.092	0.005	12.20	0.066	0.006
12.16	0.067	0.019	12.15	0.083	0.026	12.44	0.105	0.012	12.42	0.083	0.005	13.21	0.080	0.007
13.17	0.095	0.022	13.15	0.085	0.027	13.43	0.086	0.010	13.42	0.081	0.005	14.23	0.058	0.006
14.18	0.064	0.018	14.16	0.068	0.024	14.43	0.081	0.009	14.41	0.080	0.005	15.24	0.064	0.006
15.18	0.078	0.020	15.16	0.083	0.026	15.43	0.079	0.010	15.41	0.081	0.005	16.25	0.069	0.006
16.19	0.096	0.022	16.17	0.077	0.025	16.42	0.071	0.009	16.41	0.075	0.005	17.26	0.062	0.006
17.20	0.083	0.021	17.18	0.124	0.032	17.42	0.069	0.009	17.40	0.072	0.005	18.27	0.073	0.006
18.21	0.103	0.023	18.18	0.059	0.022	18.42	0.069	0.009	18.40	0.065	0.004	19.28	0.069	0.006
19.21	0.079	0.020	19.19	0.034	0.017	19.42	0.092	0.011	19.39	0.070	0.005	20.29	0.056	0.006
20.22	0.099	0.023	20.19	0.092	0.028	20.41	0.089	0.011	20.39	0.073	0.005	21.30	0.049	0.005
21.23	0.083	0.021	21.20	0.060	0.022	21.41	0.074	0.010	21.38	0.061	0.004	22.31	0.053	0.005
22.23	0.101	0.023	22.21	0.098	0.029	22.41	0.072	0.010	22.38	0.058	0.004	23.32	0.050	0.005
23.24	0.112	0.024	23.21	0.122	0.032	23.40	0.051	0.008	23.38	0.058	0.004	24.33	0.040	0.005
24.25	0.091	0.022	24.22	0.064	0.023	24.40	0.071	0.009	24.37	0.066	0.004	25.34	0.056	0.006
25.26	0.093	0.022	25.22	0.059	0.022	25.40	0.073	0.010	25.37	0.059	0.004	26.35	0.046	0.005
26.26	0.073	0.019	26.23	0.058	0.022	26.39	0.055	0.008	26.36	0.062	0.004	27.36	0.048	0.005
27.27	0.083	0.021	27.24	0.102	0.029	27.39	0.063	0.009	27.36	0.065	0.004	28.37	0.050	0.005
28.28	0.068	0.019	28.24	0.066	0.024	28.39	0.073	0.010	28.36	0.066	0.004	29.38	0.050	0.005
29.28	0.071	0.019	29.25	0.065	0.023	29.38	0.062	0.009	29.35	0.052	0.004	30.40	0.041	0.005
30.29	0.113	0.024	30.25	0.063	0.023	30.38	0.056	0.008	30.35	0.057	0.004	31.41	0.041	0.005
31.30	0.072	0.019	31.26	0.106	0.030	31.38	0.055	0.008	31.34	0.056	0.004	32.42	0.045	0.005
32.31	0.069	0.019	32.27	0.107	0.030	32.38	0.065	0.009	32.34	0.059	0.004	33.43	0.047	0.005
33.31	0.096	0.022	33.27	0.109	0.030	33.37	0.064	0.009	33.33	0.059	0.004	34.44	0.038	0.005
34.32	0.092	0.022	34.28	0.088	0.027	34.37	0.060	0.009	34.33	0.081	0.005	35.45	0.042	0.005
35.33	0.089	0.022	35.28	0.126	0.032	35.37	0.099	0.011	35.33	0.087	0.005	36.46	0.058	0.006
36.33	0.141	0.027	36.29	0.025	0.015	36.36	0.063	0.009	36.32	0.042	0.003	37.47	0.035	0.004
37.34	0.127	0.026	37.30	0.129	0.033	37.36	0.082	0.010	37.32	0.070	0.005	38.48	0.034	0.004
38.35	0.090	0.022	38.30	0.092	0.028	38.36	0.071	0.009	38.31	0.038	0.003	39.49	0.018	0.003
39.36	0.129	0.026	39.31	0.079	0.026	39.35	0.053	0.008	39.31	0.025	0.003	40.50	0.022	0.003
40.36	0.026	0.012	40.31	0.034	0.017	40.35	0.023	0.005	40.30	0.023	0.003	41.51	0.015	0.003
41.37	0.083	0.021	41.32	0.042	0.019	41.35	0.031	0.006	41.30	0.035	0.003	42.52	0.028	0.004
42.38	0.077	0.020	42.33	0.089	0.027	42.35	0.017	0.005	42.30	0.007	0.001	43.53	0.017	0.003
43.39	0.080	0.020	43.33	0.112	0.031	43.34	0.036	0.007	43.29	0.098	0.005	44.52	0.0	0.0
44.39	0.219	0.034	44.34	0.178	0.039	44.34	0.118	0.012	44.01	0.0	0.0	0.0	0.0	0.0
44.97	0.0	0.0	45.34	0.0	0.0	44.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	45.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 18

TABLE 18 (cont.)

TRITON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

40 DEG - RUN 2035			45 DEG - RUN 7101			50 DEG - RUN 2040			55 DEG - RUN 2043			60 DEG - RUN 104		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
7.15	0.079	0.006	6.76	0.075	0.007	6.76	0.069	0.008	6.71	0.079	0.009	6.40	0.065	0.011
8.15	0.083	0.006	7.46	0.088	0.005	7.45	0.066	0.005	7.41	0.065	0.005	6.80	0.053	0.010
9.14	0.072	0.006	8.46	0.075	0.004	8.45	0.068	0.005	8.41	0.064	0.005	7.50	0.054	0.006
10.14	0.076	0.006	9.46	0.076	0.004	9.45	0.057	0.005	9.41	0.054	0.004	8.50	0.046	0.006
11.13	0.065	0.005	10.46	0.069	0.004	10.45	0.063	0.005	10.41	0.048	0.004	9.51	0.047	0.006
12.13	0.062	0.005	11.46	0.070	0.004	11.44	0.055	0.005	11.40	0.051	0.004	10.51	0.046	0.006
13.13	0.072	0.006	12.46	0.074	0.004	12.44	0.064	0.005	12.40	0.048	0.004	11.51	0.037	0.005
14.12	0.077	0.006	13.45	0.065	0.004	13.44	0.051	0.004	13.40	0.045	0.004	12.52	0.039	0.005
15.12	0.051	0.005	14.45	0.055	0.004	14.43	0.042	0.004	14.40	0.029	0.003	13.52	0.036	0.005
16.12	0.049	0.005	15.45	0.073	0.004	15.43	0.043	0.004	15.40	0.031	0.003	14.52	0.031	0.005
17.11	0.053	0.005	16.45	0.049	0.004	16.43	0.030	0.003	16.40	0.035	0.004	15.53	0.039	0.005
18.11	0.049	0.005	17.45	0.053	0.004	17.43	0.033	0.004	17.39	0.037	0.004	16.53	0.039	0.005
19.11	0.041	0.004	18.45	0.043	0.003	18.42	0.034	0.004	18.39	0.027	0.003	17.53	0.023	0.004
20.10	0.048	0.005	19.44	0.043	0.003	19.42	0.040	0.004	19.39	0.030	0.003	18.54	0.029	0.005
21.10	0.037	0.004	20.44	0.042	0.003	20.42	0.025	0.003	20.39	0.020	0.003	19.54	0.023	0.004
22.10	0.033	0.004	21.44	0.038	0.003	21.41	0.030	0.003	21.39	0.023	0.003	20.54	0.022	0.004
23.09	0.038	0.004	22.44	0.042	0.003	22.41	0.025	0.003	22.38	0.027	0.003	21.55	0.018	0.004
24.09	0.045	0.004	23.44	0.039	0.003	23.41	0.021	0.003	23.38	0.022	0.003	22.55	0.016	0.003
25.08	0.041	0.004	24.44	0.036	0.003	24.41	0.024	0.003	24.38	0.020	0.003	23.55	0.014	0.003
26.08	0.041	0.004	25.43	0.039	0.003	25.40	0.024	0.003	25.38	0.020	0.003	24.56	0.021	0.004
27.08	0.034	0.004	26.43	0.037	0.003	26.40	0.023	0.003	26.38	0.018	0.003	25.56	0.014	0.003
28.07	0.032	0.004	27.43	0.040	0.003	27.40	0.024	0.003	27.38	0.020	0.003	26.56	0.010	0.003
29.07	0.039	0.004	28.43	0.035	0.003	28.40	0.022	0.003	28.37	0.020	0.003	27.57	0.009	0.003
30.07	0.036	0.004	29.43	0.036	0.003	29.39	0.024	0.003	29.37	0.016	0.002	28.57	0.014	0.003
31.06	0.041	0.004	30.43	0.038	0.003	30.39	0.031	0.003	30.37	0.012	0.002	29.57	0.014	0.003
32.06	0.029	0.004	31.42	0.037	0.003	31.39	0.021	0.003	31.37	0.017	0.003	30.57	0.014	0.003
33.06	0.031	0.004	32.42	0.035	0.003	32.38	0.018	0.003	32.37	0.019	0.003	31.58	0.016	0.003
34.05	0.027	0.003	33.42	0.058	0.004	33.38	0.023	0.003	33.36	0.016	0.002	32.58	0.019	0.004
35.05	0.050	0.005	34.42	0.038	0.003	34.38	0.030	0.003	34.36	0.016	0.002	33.58	0.010	0.003
36.04	0.053	0.005	35.42	0.023	0.002	35.38	0.026	0.003	35.36	0.012	0.002	34.59	0.010	0.003
37.04	0.020	0.003	36.42	0.042	0.003	36.37	0.013	0.002	36.36	0.013	0.002	35.59	0.012	0.003
38.04	0.036	0.004	37.42	0.016	0.002	37.37	0.029	0.003	37.36	0.013	0.002	36.59	0.009	0.003
39.03	0.013	0.002	38.41	0.008	0.001	38.37	0.007	0.002	38.36	0.004	0.001	37.60	0.005	0.002
40.03	0.013	0.002	39.41	0.005	0.001	39.36	0.004	0.001	39.35	0.004	0.001	38.60	0.004	0.002
41.03	0.007	0.002	40.41	0.009	0.002	40.36	0.003	0.001	40.35	0.005	0.001	39.60	0.007	0.002
42.02	0.017	0.003	41.41	0.002	0.001	41.36	0.005	0.001	41.35	0.003	0.001	40.61	0.001	0.001
43.02	0.003	0.001	42.41	0.023	0.002	42.36	0.022	0.003	42.35	0.008	0.002	41.61	0.007	0.002
44.02	0.006	0.002	43.06	0.0	0.0	43.28	0.001	0.001	42.92	0.0	0.0	42.39	0.0	0.0

TABLE 18 (cont.)

TRITON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

65 DEG - RUN 2046			70 DEG - RUN 2030			75 DEG - RUN 2021			82 DEG - RUN 2025			90 DEG - RUN 110		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
6.77	0.052	0.007	7.21	0.050	0.004	7.11	0.047	0.002	6.77	0.048	0.005	6.41	0.044	0.006
7.46	0.051	0.004	8.21	0.047	0.004	8.12	0.047	0.002	7.47	0.043	0.003	7.12	0.030	0.003
8.46	0.049	0.004	9.21	0.041	0.004	9.13	0.041	0.002	8.46	0.038	0.003	8.13	0.041	0.004
9.46	0.049	0.004	10.21	0.043	0.004	10.13	0.035	0.002	9.45	0.033	0.002	9.13	0.027	0.003
10.46	0.039	0.004	11.20	0.043	0.004	11.14	0.029	0.002	10.45	0.032	0.002	10.14	0.026	0.003
11.46	0.039	0.004	12.20	0.039	0.004	12.14	0.031	0.002	11.44	0.028	0.002	11.14	0.016	0.002
12.46	0.041	0.004	13.20	0.027	0.003	13.15	0.027	0.002	12.43	0.024	0.002	12.15	0.020	0.003
13.46	0.040	0.004	14.20	0.031	0.003	14.15	0.018	0.002	13.42	0.027	0.002	13.16	0.019	0.003
14.45	0.022	0.003	15.20	0.025	0.003	15.16	0.018	0.002	14.41	0.018	0.002	14.16	0.015	0.002
15.45	0.023	0.003	16.20	0.022	0.003	16.17	0.015	0.001	15.41	0.014	0.002	15.17	0.011	0.002
16.45	0.021	0.003	17.19	0.017	0.002	17.17	0.014	0.001	16.40	0.012	0.001	16.18	0.012	0.002
17.45	0.020	0.003	18.19	0.018	0.002	18.18	0.016	0.001	17.39	0.014	0.002	17.18	0.010	0.002
18.45	0.020	0.003	19.19	0.015	0.002	19.18	0.014	0.001	18.38	0.009	0.001	18.19	0.008	0.002
19.45	0.013	0.002	20.19	0.013	0.002	20.19	0.014	0.001	19.38	0.009	0.001	19.19	0.008	0.002
20.45	0.015	0.002	21.19	0.011	0.002	21.19	0.011	0.001	20.37	0.010	0.001	20.20	0.009	0.002
21.44	0.015	0.002	22.18	0.016	0.002	22.20	0.009	0.001	21.36	0.007	0.001	21.21	0.005	0.001
22.44	0.020	0.003	23.18	0.013	0.002	23.20	0.008	0.001	22.35	0.008	0.001	22.21	0.004	0.001
23.44	0.013	0.002	24.18	0.012	0.002	24.21	0.008	0.001	23.35	0.009	0.001	23.22	0.005	0.001
24.44	0.014	0.002	25.18	0.011	0.002	25.22	0.007	0.001	24.34	0.008	0.001	24.23	0.005	0.001
25.44	0.010	0.002	26.18	0.011	0.002	26.22	0.008	0.001	25.33	0.006	0.001	25.23	0.004	0.001
26.44	0.012	0.002	27.18	0.011	0.002	27.23	0.007	0.001	26.32	0.006	0.001	26.24	0.004	0.001
27.44	0.012	0.002	28.17	0.009	0.002	28.23	0.007	0.001	27.32	0.005	0.001	27.24	0.003	0.001
28.43	0.008	0.002	29.17	0.009	0.002	29.24	0.006	0.001	28.31	0.004	0.001	28.25	0.004	0.001
29.43	0.012	0.002	30.17	0.010	0.002	30.24	0.005	0.001	29.30	0.008	0.001	29.26	0.004	0.001
30.43	0.013	0.002	31.17	0.005	0.001	31.25	0.006	0.001	30.29	0.002	0.001	30.26	0.002	0.001
31.43	0.009	0.002	32.17	0.010	0.002	32.26	0.007	0.001	31.29	0.005	0.001	31.27	0.003	0.001
32.43	0.013	0.002	33.17	0.010	0.002	33.26	0.005	0.001	32.28	0.005	0.001	32.28	0.002	0.001
33.43	0.012	0.002	34.16	0.004	0.001	34.27	0.004	0.001	33.27	0.001	0.000	33.28	0.004	0.001
34.43	0.007	0.002	35.16	0.008	0.002	35.27	0.004	0.001	34.26	0.004	0.001	34.29	0.001	0.001
35.42	0.007	0.002	36.16	0.005	0.001	36.28	0.001	0.000	35.26	0.001	0.000	35.29	0.000	0.000
36.42	0.004	0.001	37.16	0.002	0.001	37.28	0.001	0.000	36.25	0.000	0.000	36.30	0.001	0.000
37.42	0.001	0.001	38.16	0.001	0.001	38.29	0.001	0.000	37.24	0.001	0.000	37.31	0.000	0.000
38.42	0.002	0.001	39.15	0.002	0.001	39.29	0.000	0.000	38.23	0.000	0.000	38.31	0.000	0.000
39.42	0.004	0.001	40.15	0.001	0.001	40.30	0.001	0.000	39.22	0.001	0.000	39.19	0.0	0.0
40.42	0.000	0.000	41.15	0.001	0.001	41.18	0.0	0.0	39.97	0.0	0.0	0.0	0.0	0.0
41.42	0.002	0.001	41.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 18 (cont.)

TRITON FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

110 DEG - RUN 107			160 DEG - RUN 2066											
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR (MB/SR-MEV)	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR (MB/SR-MEV)	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR (MB/SR-MEV)	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR (MB/SR-MEV)	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR (MB/SR-MEV)
6.41	0.034	0.005	6.61	0.034	0.010									
7.12	0.028	0.003	7.32	0.016	0.004									
8.12	0.030	0.003	8.34	0.023	0.005									
9.13	0.025	0.003	9.36	0.014	0.004									
10.13	0.021	0.002	10.38	0.010	0.003									
11.14	0.016	0.002	11.40	0.016	0.004									
12.15	0.012	0.002	12.42	0.011	0.003									
13.15	0.012	0.002	13.44	0.007	0.003									
14.16	0.012	0.002	14.46	0.007	0.003									
15.16	0.007	0.001	15.48	0.001	0.001									
16.17	0.006	0.001	16.50	0.002	0.002									
17.17	0.006	0.001	17.53	0.003	0.002									
18.18	0.006	0.001	18.55	0.002	0.002									
19.19	0.005	0.001	19.57	0.001	0.001									
20.19	0.004	0.001	20.59	0.005	0.002									
21.20	0.002	0.001	21.61	0.001	0.001									
22.20	0.002	0.001	22.63	0.0	0.0									
23.21	0.003	0.001	23.65	0.002	0.002									
24.22	0.002	0.001	24.67	0.002	0.002									
25.22	0.001	0.001	25.69	0.003	0.002									
26.23	0.001	0.001	26.71	0.0	0.0									
27.23	0.002	0.001	27.73	0.001	0.001									
28.24	0.001	0.001	28.75	0.0	0.0									
29.24	0.001	0.000	29.77	0.0	0.0									
30.25	0.001	0.000	30.79	0.0	0.0									
31.26	0.001	0.001	31.81	0.0	0.0									
32.26	0.000	0.000	32.83	0.0	0.0									
33.27	0.0	0.0	33.85	0.0	0.0									
34.27	0.000	0.000	34.67	0.0	0.0									
35.28	0.001	0.000	0.0	0.0	0.0									
36.29	0.0	0.0	0.0	0.0	0.0									
37.14	0.0	0.0	0.0	0.0	0.0									

HELIUM-3 FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

12 DEG - RUN 117			15 DEG - RUN 116			25 DEG - RUN 2047			30 DEG - RUN 7106			35 DEG - RUN 2004		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
6.82	0.070	0.030	6.82	0.111	0.048	8.35	0.108	0.018	8.39	0.081	0.008	8.46	0.079	0.010
7.23	0.060	0.028	7.22	0.099	0.046	8.75	0.087	0.017	8.79	0.080	0.008	8.87	0.098	0.012
7.63	0.111	0.038	7.62	0.063	0.036	9.15	0.123	0.020	9.19	0.107	0.009	9.27	0.111	0.012
8.03	0.114	0.039	8.02	0.125	0.051	9.55	0.132	0.020	9.58	0.078	0.008	9.68	0.101	0.012
8.44	0.062	0.028	8.43	0.127	0.052	10.24	0.111	0.012	10.28	0.088	0.005	10.38	0.094	0.007
8.84	0.109	0.038	8.83	0.197	0.064	11.24	0.089	0.011	11.28	0.095	0.005	11.39	0.090	0.007
9.24	0.065	0.029	9.23	0.188	0.063	12.24	0.094	0.011	12.27	0.071	0.005	12.41	0.080	0.007
9.64	0.075	0.031	9.63	0.061	0.036	13.24	0.086	0.010	13.27	0.075	0.005	13.42	0.069	0.006
10.35	0.089	0.022	10.34	0.058	0.022	14.23	0.083	0.010	14.26	0.077	0.005	14.43	0.064	0.006
11.36	0.083	0.021	11.34	0.071	0.024	15.23	0.063	0.009	15.26	0.076	0.005	15.44	0.073	0.006
12.36	0.085	0.021	12.35	0.129	0.033	16.23	0.054	0.008	16.26	0.068	0.004	16.45	0.059	0.006
13.37	0.096	0.022	13.35	0.106	0.030	17.22	0.084	0.010	17.25	0.072	0.005	17.46	0.060	0.006
14.38	0.072	0.019	14.36	0.061	0.023	18.22	0.077	0.010	18.25	0.077	0.005	18.47	0.060	0.006
15.38	0.084	0.021	15.37	0.037	0.018	19.22	0.056	0.008	19.24	0.074	0.005	19.48	0.064	0.006
16.39	0.055	0.017	16.37	0.093	0.028	20.21	0.080	0.010	20.24	0.065	0.004	20.49	0.052	0.005
17.40	0.084	0.021	17.38	0.070	0.024	21.21	0.086	0.010	21.24	0.070	0.005	21.50	0.054	0.005
18.41	0.104	0.023	18.38	0.077	0.025	22.21	0.069	0.009	22.23	0.061	0.004	22.51	0.050	0.005
19.41	0.114	0.024	19.39	0.018	0.012	23.21	0.061	0.009	23.23	0.068	0.004	23.52	0.045	0.005
20.42	0.088	0.021	20.40	0.096	0.028	24.20	0.067	0.009	24.22	0.061	0.004	24.53	0.052	0.005
21.43	0.057	0.017	21.40	0.071	0.024	25.20	0.062	0.009	25.22	0.055	0.004	25.54	0.043	0.005
22.44	0.056	0.017	22.41	0.049	0.020	26.20	0.055	0.008	26.21	0.051	0.004	26.55	0.033	0.004
23.44	0.117	0.025	23.41	0.092	0.028	27.19	0.058	0.009	27.21	0.057	0.004	27.56	0.049	0.005
24.45	0.081	0.021	24.42	0.088	0.027	28.19	0.070	0.009	28.21	0.054	0.004	28.57	0.047	0.005
25.46	0.077	0.020	25.43	0.102	0.029	29.19	0.062	0.009	29.20	0.052	0.004	29.59	0.038	0.005
26.46	0.090	0.022	26.43	0.094	0.028	30.18	0.061	0.009	30.20	0.053	0.004	30.60	0.044	0.005
27.47	0.064	0.018	27.44	0.069	0.024	31.18	0.086	0.010	31.19	0.057	0.004	31.61	0.042	0.005
28.48	0.085	0.021	28.44	0.039	0.018	32.18	0.062	0.009	32.19	0.050	0.004	32.62	0.018	0.003
29.49	0.066	0.018	29.45	0.061	0.023	33.18	0.064	0.009	33.19	0.066	0.004	33.63	0.038	0.005
30.49	0.103	0.023	30.46	0.063	0.023	34.17	0.074	0.010	34.18	0.063	0.004	34.64	0.040	0.005
31.50	0.068	0.019	31.46	0.063	0.023	35.17	0.060	0.009	35.18	0.051	0.004	35.65	0.041	0.005
32.51	0.056	0.017	32.47	0.051	0.021	36.17	0.070	0.009	36.17	0.058	0.004	36.66	0.041	0.005
33.51	0.158	0.029	33.47	0.117	0.031	37.16	0.055	0.008	37.17	0.053	0.004	37.67	0.039	0.005
34.52	0.093	0.022	34.48	0.042	0.019	38.16	0.067	0.009	38.16	0.058	0.004	38.68	0.033	0.004
35.53	0.089	0.022	35.49	0.072	0.025	39.16	0.061	0.009	39.16	0.080	0.005	39.69	0.044	0.005
36.54	0.049	0.016	36.49	0.105	0.030	40.15	0.060	0.009	40.16	0.049	0.004	40.70	0.040	0.005
37.54	0.077	0.020	37.50	0.134	0.033	41.15	0.101	0.011	41.15	0.098	0.005	41.71	0.047	0.005
38.55	0.127	0.026	38.50	0.128	0.033	42.15	0.048	0.008	42.15	0.037	0.003	42.72	0.061	0.006
39.56	0.191	0.032	39.51	0.076	0.025	43.15	0.103	0.011	43.14	0.026	0.003	43.73	0.017	0.003
40.56	0.223	0.034	40.52	0.098	0.029	44.14	0.022	0.005	44.14	0.017	0.002	44.74	0.023	0.004
41.57	0.145	0.028	41.52	0.158	0.036	45.14	0.033	0.006	45.13	0.026	0.003	45.75	0.021	0.003
42.58	0.110	0.024	42.53	0.188	0.040	46.14	0.013	0.004	46.13	0.027	0.003	46.77	0.009	0.002
43.59	0.145	0.027	43.53	0.208	0.042	47.13	0.048	0.008	47.13	0.024	0.003	47.78	0.028	0.004
44.59	0.036	0.014	44.54	0.034	0.017	48.13	0.053	0.008	47.95	0.0	0.0	48.79	0.0	0.0
45.60	0.066	0.019	45.55	0.025	0.015	48.83	0.011	0.006	0.0	0.0	0.0	49.47	0.0	0.0
46.61	0.122	0.025	46.55	0.058	0.022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47.62	0.037	0.014	47.56	0.034	0.017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48.62	0.076	0.020	48.56	0.050	0.021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49.58	0.0	0.0	49.55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 19

TABLE 19 (cont.)

HELIUM-3 FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

40 DEG - RUN 2035			45 DEG - RUN 7101			55 DEG - RUN 2043			60 DEG - RUN 104			65 DEG - RUN 2046		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
13.53	0.065	0.005	13.55	0.055	0.004	13.55	0.050	0.004	6.85	0.076	0.012	8.46	0.065	0.008
14.52	0.067	0.005	14.55	0.058	0.004	14.55	0.041	0.004	7.25	0.078	0.012	8.86	0.060	0.007
15.52	0.058	0.005	15.55	0.058	0.004	15.55	0.042	0.004	7.65	0.075	0.011	9.26	0.065	0.008
16.52	0.060	0.005	16.55	0.055	0.004	16.55	0.041	0.004	8.05	0.076	0.012	9.66	0.059	0.007
17.51	0.062	0.005	17.55	0.052	0.004	17.54	0.042	0.004	8.45	0.074	0.011	10.36	0.058	0.005
18.51	0.053	0.005	18.55	0.053	0.004	18.54	0.036	0.004	8.85	0.079	0.012	11.36	0.055	0.004
19.50	0.053	0.005	19.54	0.056	0.004	19.54	0.034	0.004	9.25	0.064	0.011	12.36	0.055	0.004
20.50	0.054	0.005	20.54	0.047	0.003	20.54	0.030	0.003	9.66	0.055	0.010	13.36	0.034	0.004
21.50	0.044	0.004	21.54	0.044	0.003	21.54	0.027	0.003	10.36	0.047	0.006	14.35	0.036	0.004
22.49	0.045	0.004	22.54	0.046	0.003	22.53	0.025	0.003	11.36	0.063	0.007	15.35	0.034	0.004
23.49	0.049	0.005	23.54	0.043	0.003	23.53	0.026	0.003	12.36	0.049	0.006	16.35	0.032	0.003
24.49	0.041	0.004	24.54	0.038	0.003	24.53	0.022	0.003	13.37	0.041	0.005	17.35	0.030	0.003
25.48	0.036	0.004	25.53	0.037	0.003	25.53	0.024	0.003	14.37	0.046	0.006	18.35	0.026	0.003
26.48	0.044	0.004	26.53	0.035	0.003	26.53	0.023	0.003	15.37	0.037	0.005	19.35	0.019	0.003
27.48	0.042	0.004	27.53	0.034	0.003	27.53	0.021	0.003	16.38	0.023	0.004	20.35	0.030	0.003
28.47	0.035	0.004	28.53	0.034	0.003	28.52	0.027	0.003	17.38	0.027	0.004	21.35	0.019	0.003
29.47	0.040	0.004	29.53	0.033	0.003	29.52	0.023	0.003	18.38	0.034	0.005	22.34	0.025	0.003
30.46	0.041	0.004	30.53	0.028	0.003	30.52	0.021	0.003	19.39	0.027	0.004	23.34	0.018	0.003
31.46	0.043	0.004	31.52	0.031	0.003	31.52	0.020	0.003	20.39	0.027	0.004	24.34	0.018	0.003
32.46	0.031	0.004	32.52	0.032	0.003	32.52	0.014	0.002	21.39	0.026	0.004	25.34	0.020	0.003
33.45	0.045	0.004	33.52	0.043	0.003	33.51	0.019	0.003	22.40	0.023	0.004	26.34	0.014	0.002
34.45	0.022	0.003	34.52	0.032	0.003	34.51	0.013	0.002	23.40	0.031	0.005	27.34	0.020	0.003
35.45	0.029	0.004	35.52	0.028	0.003	35.51	0.010	0.002	24.40	0.019	0.004	28.34	0.017	0.002
36.44	0.029	0.004	36.52	0.030	0.003	36.51	0.012	0.002	25.41	0.017	0.003	29.33	0.014	0.002
37.44	0.030	0.004	37.51	0.028	0.003	37.51	0.008	0.002	26.41	0.016	0.003	30.33	0.013	0.002
38.44	0.032	0.004	38.51	0.034	0.003	38.51	0.013	0.002	27.41	0.016	0.003	31.33	0.019	0.003
39.43	0.034	0.004	39.51	0.021	0.002	39.50	0.008	0.002	28.42	0.019	0.004	32.33	0.009	0.002
40.43	0.029	0.004	40.51	0.033	0.003	40.50	0.010	0.002	29.42	0.015	0.003	33.33	0.012	0.002
41.43	0.027	0.003	41.51	0.008	0.001	41.50	0.007	0.002	30.42	0.015	0.003	34.33	0.010	0.002
42.42	0.042	0.004	42.51	0.007	0.001	42.50	0.002	0.001	31.43	0.014	0.003	35.33	0.008	0.002
43.42	0.005	0.002	43.51	0.006	0.001	43.50	0.004	0.001	32.43	0.006	0.002	36.32	0.008	0.002
44.41	0.014	0.002	44.50	0.006	0.001	44.49	0.003	0.001	33.43	0.017	0.003	37.32	0.011	0.002
45.41	0.007	0.002	45.50	0.013	0.002	45.49	0.003	0.001	34.43	0.017	0.003	38.32	0.006	0.001
46.41	0.012	0.002	46.50	0.002	0.001	46.49	0.002	0.001	35.44	0.012	0.003	39.32	0.006	0.002
47.40	0.013	0.002	47.12	0.0	0.0	0.0	0.0	0.0	36.44	0.011	0.003	40.32	0.008	0.002
48.23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.44	0.004	0.002	41.32	0.003	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.45	0.014	0.003	42.32	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.45	0.003	0.001	43.31	0.003	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.45	0.006	0.002	44.31	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.46	0.002	0.001	45.31	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.46	0.004	0.002	45.91	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.46	0.002	0.001	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.47	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.47	0.002	0.001	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.30	0.0	0.0	0.0	0.0	0.0

TABLE 19 (cont.)

HELIUM-3 FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

70 DEG - RUN 2030			75 DEG - RUN 2021			82 DEG - RUN 2025			90 DEG - RUN 110			110 DEG - RUN 107		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
13.60	0.040	0.004	8.57	0.057	0.004	8.61	0.059	0.005	6.97	0.049	0.007	6.86	0.067	0.007
14.60	0.033	0.003	8.97	0.056	0.004	9.01	0.045	0.004	7.37	0.051	0.007	7.27	0.044	0.006
15.60	0.026	0.003	9.38	0.059	0.004	9.40	0.056	0.005	7.77	0.054	0.007	7.67	0.042	0.005
16.60	0.030	0.003	9.78	0.054	0.004	9.80	0.047	0.005	8.18	0.055	0.007	8.07	0.045	0.006
17.59	0.029	0.003	10.48	0.046	0.002	10.49	0.044	0.003	8.58	0.053	0.007	8.47	0.042	0.005
18.59	0.024	0.003	11.49	0.044	0.002	11.49	0.041	0.003	8.98	0.046	0.006	8.88	0.037	0.005
19.59	0.026	0.003	12.49	0.047	0.002	12.48	0.038	0.003	9.38	0.045	0.006	9.28	0.037	0.005
20.59	0.018	0.002	13.50	0.038	0.002	13.47	0.030	0.002	9.79	0.034	0.005	9.68	0.041	0.005
21.59	0.020	0.003	14.51	0.031	0.002	14.46	0.028	0.002	10.49	0.035	0.003	10.38	0.029	0.003
22.58	0.018	0.003	15.51	0.028	0.002	15.46	0.027	0.002	11.50	0.037	0.004	11.39	0.024	0.003
23.58	0.015	0.002	16.52	0.023	0.002	16.45	0.022	0.002	12.50	0.024	0.003	12.40	0.024	0.003
24.58	0.014	0.002	17.52	0.026	0.002	17.44	0.021	0.002	13.51	0.026	0.003	13.40	0.018	0.002
25.58	0.016	0.002	18.53	0.022	0.002	18.43	0.019	0.002	14.51	0.021	0.003	14.41	0.017	0.002
26.58	0.015	0.002	19.53	0.019	0.002	19.43	0.019	0.002	15.52	0.018	0.002	15.41	0.014	0.002
27.58	0.013	0.002	20.54	0.016	0.001	20.42	0.015	0.002	16.53	0.017	0.002	16.42	0.012	0.002
28.57	0.018	0.002	21.54	0.018	0.002	21.41	0.017	0.002	17.53	0.014	0.002	17.43	0.011	0.002
29.57	0.016	0.002	22.55	0.015	0.001	22.40	0.015	0.002	18.54	0.012	0.002	18.43	0.009	0.002
30.57	0.010	0.002	23.56	0.013	0.001	23.40	0.012	0.001	19.55	0.014	0.002	19.44	0.007	0.001
31.57	0.010	0.002	24.56	0.011	0.001	24.39	0.010	0.001	20.55	0.011	0.002	20.44	0.005	0.001
32.57	0.008	0.002	25.57	0.011	0.001	25.38	0.009	0.001	21.56	0.011	0.002	21.45	0.006	0.001
33.56	0.007	0.002	26.57	0.011	0.001	26.37	0.009	0.001	22.56	0.011	0.002	22.45	0.005	0.001
34.56	0.007	0.002	27.58	0.011	0.001	27.37	0.007	0.001	23.57	0.007	0.002	23.46	0.004	0.001
35.56	0.007	0.002	28.58	0.008	0.001	28.36	0.007	0.001	24.58	0.007	0.002	24.47	0.002	0.001
36.56	0.006	0.001	29.59	0.009	0.001	29.35	0.007	0.001	25.58	0.009	0.002	25.47	0.004	0.001
37.56	0.007	0.002	30.60	0.008	0.001	30.34	0.007	0.001	26.59	0.006	0.001	26.48	0.004	0.001
38.56	0.003	0.001	31.60	0.010	0.001	31.34	0.004	0.001	27.60	0.002	0.001	27.48	0.001	0.001
39.55	0.007	0.002	32.61	0.007	0.001	32.33	0.003	0.001	28.60	0.007	0.002	28.49	0.002	0.001
40.55	0.001	0.001	33.61	0.007	0.001	33.32	0.003	0.001	29.61	0.004	0.001	29.50	0.002	0.001
41.55	0.002	0.001	34.62	0.004	0.001	34.31	0.004	0.001	30.61	0.003	0.001	30.50	0.001	0.000
42.55	0.001	0.000	35.62	0.004	0.001	35.30	0.002	0.001	31.62	0.002	0.001	31.51	0.002	0.001
43.55	0.001	0.000	36.63	0.004	0.001	36.30	0.003	0.001	32.63	0.003	0.001	32.51	0.001	0.000
44.54	0.000	0.000	37.63	0.003	0.001	37.29	0.002	0.001	33.63	0.003	0.001	33.52	0.001	0.001
45.37	0.0	0.0	38.64	0.003	0.001	38.28	0.002	0.001	34.64	0.003	0.001	34.52	0.001	0.001
0.0	0.0	0.0	39.65	0.000	0.000	39.27	0.000	0.000	35.64	0.003	0.001	35.53	0.0	0.0
0.0	0.0	0.0	40.65	0.001	0.000	40.27	0.000	0.000	36.65	0.001	0.001	36.54	0.000	0.000
0.0	0.0	0.0	41.66	0.001	0.000	41.26	0.001	0.000	37.66	0.001	0.001	37.54	0.0	0.0
0.0	0.0	0.0	42.66	0.001	0.000	42.25	0.000	0.000	38.66	0.001	0.000	38.55	0.0	0.0
0.0	0.0	0.0	43.67	0.001	0.000	43.24	0.0	0.0	39.67	0.001	0.000	39.55	0.0	0.0
0.0	0.0	0.0	44.57	0.0	0.0	43.86	0.0	0.0	40.68	0.001	0.000	40.56	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.68	0.0	0.0	41.16	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.69	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.29	0.0	0.0	0.0	0.0	0.0

TABLE 19 (cont.)

HELIUM-3 FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

135 DEG - RUN 2065			160 DEG - RUN 2066											
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
7.17	0.069	0.020	12.93	0.014	0.004									
7.57	0.063	0.019	13.95	0.018	0.005									
7.97	0.046	0.016	14.97	0.007	0.003									
8.37	0.041	0.016	15.99	0.006	0.003									
8.77	0.039	0.015	17.02	0.007	0.003									
9.17	0.031	0.014	18.04	0.005	0.002									
9.57	0.023	0.012	19.06	0.004	0.002									
10.27	0.039	0.010	20.08	0.004	0.002									
11.27	0.025	0.008	21.10	0.001	0.001									
12.27	0.021	0.007	22.12	0.004	0.002									
13.27	0.029	0.008	23.14	0.002	0.002									
14.27	0.019	0.007	24.16	0.0	0.0									
15.27	0.013	0.006	25.18	0.0	0.0									
16.27	0.011	0.005	26.20	0.0	0.0									
17.27	0.012	0.005	27.22	0.002	0.002									
18.27	0.007	0.004	28.24	0.0	0.0									
19.27	0.009	0.005	29.26	0.0	0.0									
20.27	0.007	0.004	30.28	0.0	0.0									
21.27	0.002	0.002	31.30	0.001	0.001									
22.27	0.0	0.0	32.32	0.0	0.0									
23.27	0.005	0.003	33.34	0.0	0.0									
24.27	0.0	0.0	34.36	0.0	0.0									
25.27	0.0	0.0	35.38	0.0	0.0									
26.27	0.002	0.002	36.40	0.0	0.0									
27.27	0.002	0.002	37.42	0.0	0.0									
28.27	0.0	0.0	38.26	0.0	0.0									
29.27	0.002	0.002	0.0	0.0	0.0									
30.27	0.0	0.0	0.0	0.0	0.0									
31.27	0.0	0.0	0.0	0.0	0.0									
32.27	0.0	0.0	0.0	0.0	0.0									
33.27	0.0	0.0	0.0	0.0	0.0									
34.27	0.0	0.0	0.0	0.0	0.0									
35.27	0.0	0.0	0.0	0.0	0.0									
36.27	0.0	0.0	0.0	0.0	0.0									
37.27	0.0	0.0	0.0	0.0	0.0									
38.27	0.0	0.0	0.0	0.0	0.0									
38.97	0.0	0.0	0.0	0.0	0.0									

TABLE 20

ALPHA FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

12 DEG - RUN 117			15 DEG - RUN 116			25 DEG - RUN 2047			30 DEG - RUN 101			35 DEG - RUN 2004		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
3.05	1.02	0.12	3.19	1.03	0.15	6.51	2.69	0.09	3.19	0.93	0.05	5.58	2.16	0.05
3.45	0.99	0.11	3.60	1.12	0.15	6.90	2.56	0.09	3.59	1.18	0.06	5.99	2.28	0.06
3.85	1.24	0.13	4.00	1.30	0.17	7.30	2.63	0.09	3.99	1.43	0.06	6.39	2.32	0.06
4.26	1.48	0.14	4.40	1.63	0.19	7.70	2.39	0.09	4.39	1.73	0.07	6.80	2.40	0.06
4.66	1.75	0.15	4.80	1.89	0.20	8.10	2.36	0.09	4.79	1.91	0.07	7.20	2.27	0.06
5.06	1.98	0.16	5.21	2.05	0.21	8.50	2.17	0.08	5.19	2.05	0.07	7.61	2.14	0.05
5.46	2.20	0.17	5.61	2.07	0.21	8.90	2.39	0.08	5.59	2.15	0.07	8.01	1.99	0.05
5.87	2.52	0.18	6.01	2.08	0.21	9.30	1.88	0.08	5.99	2.23	0.08	8.41	1.92	0.05
6.27	2.43	0.18	6.41	2.59	0.23	9.70	1.77	0.07	6.40	2.27	0.08	8.82	1.78	0.05
6.67	2.39	0.18	6.82	2.77	0.24	10.39	1.53	0.04	6.80	2.30	0.08	9.22	1.69	0.05
7.08	2.50	0.18	7.22	2.85	0.24	11.39	1.25	0.04	7.20	2.31	0.08	9.63	1.50	0.05
7.48	2.42	0.18	7.62	2.55	0.23	12.39	1.08	0.04	7.60	2.26	0.08	10.33	1.33	0.03
7.88	2.574	0.183	8.02	2.196	0.215	13.38	0.941	0.034	8.00	2.057	0.073	11.34	1.039	0.024
8.28	2.380	0.176	8.42	2.080	0.209	14.38	0.650	0.029	8.40	1.961	0.071	12.36	0.882	0.022
8.69	2.101	0.165	8.83	2.283	0.219	15.38	0.604	0.028	8.80	1.890	0.070	13.37	0.674	0.019
9.09	2.007	0.162	9.23	2.056	0.208	16.37	0.501	0.025	9.20	1.664	0.066	14.38	0.516	0.017
9.49	1.919	0.158	9.63	1.820	0.195	17.37	0.410	0.023	9.61	1.582	0.064	15.39	0.433	0.015
10.20	1.650	0.093	10.34	1.526	0.113	18.37	0.400	0.022	10.31	1.457	0.039	16.40	0.389	0.015
11.21	1.545	0.090	11.34	1.397	0.108	19.37	0.311	0.020	11.31	1.125	0.034	17.41	0.305	0.013
12.21	1.246	0.081	12.35	1.112	0.097	20.36	0.327	0.020	12.31	1.013	0.032	18.42	0.283	0.012
13.22	0.919	0.069	13.35	0.920	0.088	21.36	0.263	0.018	13.32	0.760	0.028	19.43	0.242	0.012
14.23	0.764	0.063	14.36	0.704	0.077	22.36	0.235	0.017	14.32	0.653	0.026	20.44	0.216	0.011
15.23	0.613	0.056	15.37	0.763	0.080	23.35	0.225	0.017	15.32	0.503	0.023	21.45	0.192	0.010
16.24	0.479	0.050	16.37	0.558	0.068	24.35	0.219	0.017	16.33	0.420	0.021	22.46	0.194	0.010
17.25	0.524	0.052	17.38	0.432	0.060	25.35	0.185	0.015	17.33	0.376	0.020	23.47	0.153	0.009
18.26	0.369	0.044	18.38	0.384	0.057	26.34	0.149	0.014	18.33	0.317	0.018	24.48	0.159	0.009
19.26	0.347	0.043	19.39	0.344	0.054	27.34	0.183	0.015	19.34	0.259	0.016	25.49	0.145	0.009
20.27	0.344	0.042	20.40	0.303	0.050	28.34	0.133	0.013	20.34	0.225	0.015	26.50	0.133	0.009
21.28	0.361	0.043	21.40	0.359	0.055	29.33	0.140	0.013	21.34	0.206	0.015	27.52	0.114	0.008
22.28	0.276	0.038	22.41	0.247	0.046	30.33	0.130	0.013	22.35	0.204	0.015	28.53	0.109	0.008
23.29	0.186	0.031	23.41	0.267	0.047	31.33	0.114	0.012	23.35	0.178	0.014	29.54	0.103	0.008
24.30	0.300	0.040	24.42	0.230	0.044	32.33	0.101	0.011	24.35	0.122	0.011	30.55	0.091	0.007
25.31	0.206	0.033	25.43	0.170	0.038	33.32	0.095	0.011	25.36	0.159	0.013	31.56	0.074	0.006
26.31	0.228	0.034	26.43	0.259	0.047	34.32	0.098	0.011	26.36	0.135	0.012	32.57	0.072	0.006
27.32	0.161	0.029	27.44	0.213	0.042	35.32	0.111	0.012	27.36	0.128	0.012	33.58	0.082	0.007
28.33	0.212	0.033	28.44	0.230	0.044	36.31	0.117	0.012	28.37	0.108	0.011	34.59	0.078	0.007
29.33	0.171	0.030	29.45	0.193	0.040	37.31	0.065	0.009	29.37	0.116	0.011	35.60	0.084	0.007
30.34	0.204	0.033	30.46	0.142	0.034	38.31	0.086	0.010	30.37	0.097	0.010	36.61	0.036	0.004
31.35	0.145	0.027	31.46	0.169	0.038	39.30	0.093	0.011	31.38	0.110	0.011	37.62	0.056	0.006
32.36	0.128	0.026	32.47	0.131	0.033	40.30	0.082	0.010	32.38	0.088	0.010	38.63	0.060	0.006
33.36	0.155	0.028	33.47	0.121	0.032	41.30	0.074	0.010	33.38	0.089	0.010	39.64	0.066	0.006
34.37	0.154	0.028	34.48	0.213	0.042	42.30	0.080	0.010	34.38	0.110	0.011	40.65	0.065	0.006
35.38	0.107	0.024	35.49	0.099	0.029	43.29	0.053	0.008	35.39	0.072	0.009	41.66	0.064	0.006
36.39	0.047	0.016	36.49	0.078	0.026	44.29	0.062	0.009	36.39	0.041	0.007	42.68	0.050	0.005
37.39	0.142	0.027	37.50	0.099	0.029	45.29	0.069	0.009	37.39	0.075	0.009	43.69	0.052	0.005
38.40	0.083	0.021	38.50	0.158	0.036	46.28	0.062	0.009	38.40	0.067	0.008	44.70	0.058	0.006
39.41	0.096	0.022	39.51	0.126	0.033	47.28	0.054	0.008	39.40	0.066	0.008	45.71	0.041	0.005
40.41	0.166	0.029	40.52	0.132	0.033	48.28	0.042	0.007	40.40	0.062	0.008	46.72	0.028	0.004
41.42	0.121	0.025	41.52	0.078	0.026	49.27	0.051	0.008	41.41	0.068	0.008	47.73	0.039	0.005
42.43	0.118	0.025	42.53	0.154	0.036	50.27	0.039	0.007	42.41	0.066	0.008	48.74	0.027	0.004
43.44	0.076	0.020	43.53	0.135	0.034	51.27	0.038	0.007	43.41	0.059	0.008	49.75	0.023	0.004
44.44	0.088	0.021	44.54	0.094	0.028	52.26	0.035	0.007	44.42	0.054	0.007	50.76	0.011	0.003
45.45	0.115	0.024	45.54	0.060	0.023	53.26	0.007	0.003	45.42	0.053	0.007	51.77	0.008	0.002
46.46	0.113	0.024	46.55	0.065	0.023	54.26	0.005	0.002	46.42	0.044	0.007	52.78	0.002	0.001
47.46	0.116	0.025	47.56	0.053	0.021	55.26	0.002	0.002	47.43	0.038	0.006	53.79	0.0	0.0
48.47	0.066	0.019	48.56	0.076	0.025	56.25	0.008	0.003	48.43	0.047	0.007	54.80	0.003	0.001
49.48	0.089	0.022	49.57	0.113	0.031	57.25	0.000	0.001	49.43	0.045	0.007	55.66	0.0	0.0
50.49	0.061	0.018	50.57	0.052	0.021	58.25	0.016	0.004	50.44	0.031	0.006	0.0	0.0	0.0
51.49	0.048	0.016	51.58	0.092	0.028	59.24	0.001	0.001	51.44	0.013	0.004	0.0	0.0	0.0
52.50	0.042	0.015	52.59	0.042	0.019	60.24	0.002	0.002	52.44	0.011	0.003	0.0	0.0	0.0
53.51	0.031	0.013	53.59	0.008	0.008	60.81	0.0	0.0	53.45	0.004	0.002	0.0	0.0	0.0
54.51	0.0	0.0	54.60	0.008	0.008	0.0	0.0	0.0	54.45	0.0	0.0	0.0	0.0	0.0
55.52	0.010	0.007	55.60	0.008	0.008	0.0	0.0	0.0	55.45	0.007	0.003	0.0	0.0	0.0
0.0	0.0	0.0	56.61	0.008	0.008	0.0	0.0	0.0	56.46	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	57.62	0.0	0.0	0.0	0.0	0.0	57.46	0.001	0.001	0.0	0.0	0.0
0.0	0.0	0.0	58.57	0.047	0.021	0.0	0.0	0.0	58.46	0.007	0.003	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.46	0.002	0.001	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.22	0.0	0.0	0.0	0.0	0.0

TABLE 20 (cont.)

ALPHA FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

40 DEG - RUN 2035			45 DEG - RUN 7101			55 DEG - RUN 2043			60 DEG - RUN 104			65 DEG - RUN 2046		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
14.92	0.45	0.01	14.95	0.42	0.01	14.95	0.30	0.01	3.03	1.00	0.04	6.62	1.82	0.04
15.92	0.39	0.01	15.95	0.37	0.01	15.95	0.26	0.01	3.44	1.30	0.05	7.02	1.71	0.04
16.91	0.34	0.01	16.95	0.33	0.01	16.94	0.20	0.01	3.84	1.59	0.05	7.41	1.60	0.04
17.91	0.31	0.01	17.95	0.28	0.01	17.94	0.20	0.01	4.24	1.75	0.06	7.81	1.48	0.04
18.91	0.27	0.01	18.94	0.25	0.01	18.94	0.17	0.01	4.64	1.79	0.06	8.21	1.27	0.03
19.90	0.21	0.01	19.94	0.21	0.01	19.94	0.15	0.01	5.04	1.79	0.06	8.61	1.19	0.03
20.90	0.19	0.01	20.94	0.19	0.01	20.94	0.11	0.01	5.44	1.83	0.06	9.01	1.14	0.03
21.90	0.18	0.01	21.94	0.18	0.01	21.94	0.10	0.01	5.84	1.81	0.06	9.41	1.00	0.03
22.89	0.162	0.008	22.94	0.162	0.006	22.93	0.088	0.006	6.25	1.848	0.057	10.11	0.824	0.017
23.89	0.150	0.008	23.94	0.133	0.006	23.93	0.091	0.006	6.65	1.767	0.055	11.11	0.634	0.015
24.89	0.144	0.008	24.94	0.124	0.006	24.93	0.078	0.005	7.05	1.784	0.056	12.11	0.483	0.013
25.88	0.121	0.007	25.93	0.114	0.005	25.93	0.079	0.005	7.45	1.608	0.053	13.11	0.422	0.012
26.88	0.116	0.007	26.93	0.101	0.005	26.93	0.064	0.005	7.85	1.503	0.051	14.10	0.294	0.010
27.87	0.099	0.007	27.93	0.088	0.005	27.92	0.053	0.004	8.25	1.386	0.049	15.10	0.246	0.009
28.87	0.097	0.007	28.93	0.089	0.005	28.92	0.043	0.004	8.65	1.216	0.046	16.10	0.213	0.009
29.87	0.093	0.006	29.93	0.070	0.004	29.92	0.045	0.004	9.05	1.183	0.045	17.10	0.171	0.008
30.86	0.092	0.006	30.93	0.072	0.004	30.92	0.039	0.004	9.46	1.028	0.042	18.10	0.131	0.007
31.86	0.075	0.006	31.92	0.063	0.004	31.92	0.038	0.004	10.16	0.896	0.025	19.10	0.107	0.006
32.86	0.068	0.005	32.92	0.068	0.004	32.92	0.036	0.004	11.16	0.681	0.022	20.10	0.096	0.006
33.85	0.065	0.005	33.92	0.056	0.004	33.91	0.029	0.003	12.16	0.552	0.020	21.09	0.086	0.006
34.85	0.066	0.005	34.92	0.057	0.004	34.91	0.030	0.003	13.17	0.380	0.016	22.09	0.081	0.005
35.85	0.064	0.005	35.92	0.052	0.004	35.91	0.027	0.003	14.17	0.318	0.015	23.09	0.065	0.005
36.84	0.041	0.004	36.92	0.036	0.003	36.91	0.017	0.003	15.17	0.244	0.013	24.09	0.060	0.005
37.84	0.059	0.005	37.91	0.063	0.004	37.91	0.029	0.003	16.18	0.206	0.012	25.09	0.043	0.004
38.83	0.050	0.005	38.91	0.055	0.004	38.90	0.017	0.003	17.18	0.184	0.011	26.09	0.049	0.004
39.83	0.034	0.004	39.91	0.056	0.004	39.90	0.021	0.003	18.18	0.131	0.010	27.09	0.044	0.004
40.83	0.044	0.004	40.91	0.040	0.003	40.90	0.018	0.003	19.19	0.118	0.009	28.09	0.039	0.004
41.82	0.035	0.004	41.91	0.035	0.003	41.90	0.015	0.002	20.19	0.107	0.009	29.08	0.035	0.004
42.82	0.034	0.004	42.91	0.037	0.003	42.90	0.014	0.002	21.19	0.091	0.008	30.08	0.032	0.003
43.82	0.037	0.004	43.90	0.025	0.003	43.90	0.011	0.002	22.20	0.072	0.007	31.08	0.023	0.003
44.81	0.041	0.004	44.90	0.015	0.002	44.89	0.008	0.002	23.20	0.078	0.007	32.08	0.023	0.003
45.81	0.028	0.004	45.90	0.021	0.002	45.89	0.008	0.002	24.20	0.077	0.007	33.08	0.020	0.003
46.81	0.017	0.003	46.90	0.015	0.002	46.89	0.007	0.002	25.21	0.057	0.006	34.08	0.015	0.002
47.80	0.030	0.004	47.90	0.012	0.002	47.89	0.004	0.001	26.21	0.064	0.007	35.08	0.017	0.002
48.80	0.014	0.003	48.90	0.008	0.001	48.89	0.001	0.001	27.21	0.046	0.006	36.07	0.016	0.002
49.80	0.012	0.002	49.90	0.004	0.001	49.89	0.003	0.001	28.22	0.041	0.005	37.07	0.015	0.002
50.64	0.005	0.002	50.89	0.002	0.001	50.88	0.001	0.001	29.22	0.040	0.005	38.07	0.016	0.002
0.0	0.0	0.0	51.89	0.002	0.001	51.88	0.0	0.0	30.22	0.031	0.005	39.07	0.015	0.002
0.0	0.0	0.0	52.89	0.001	0.000	52.88	0.001	0.001	31.23	0.028	0.004	40.07	0.012	0.002
0.0	0.0	0.0	53.89	0.000	0.000	53.88	0.0	0.0	32.23	0.028	0.004	41.07	0.008	0.002
0.0	0.0	0.0	54.89	0.004	0.001	54.88	0.001	0.001	33.23	0.021	0.004	42.07	0.008	0.002
0.0	0.0	0.0	55.89	0.001	0.001	55.87	0.001	0.001	34.24	0.031	0.005	43.06	0.005	0.001
0.0	0.0	0.0	56.88	0.000	0.000	56.87	0.0	0.0	35.24	0.022	0.004	44.06	0.005	0.001
0.0	0.0	0.0	57.68	0.0	0.0	57.62	0.0	0.0	36.24	0.013	0.003	45.06	0.007	0.002
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.25	0.015	0.003	46.06	0.003	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.25	0.023	0.004	47.06	0.005	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.25	0.021	0.004	48.06	0.002	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.26	0.017	0.003	49.06	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.26	0.012	0.003	50.05	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.26	0.006	0.002	51.05	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.27	0.008	0.002	52.05	0.001	0.001
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.27	0.010	0.003	53.05	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.27	0.009	0.003	54.05	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.28	0.004	0.002	55.05	0.000	0.000
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.28	0.003	0.001	56.05	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.28	0.001	0.001	56.57	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.29	0.001	0.001	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.29	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.29	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.30	0.001	0.001	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.30	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.30	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.31	0.001	0.001	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.31	0.0	0.0	0.0	0.0	0.0

TABLE 20 (cont.)

ALPHA FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

70 DEG - RUN 2030			75 DEG - RUN 2021			82 DEG - RUN 2025			90 DEG - RUN 110			110 DEG - RUN 107		
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
15.00	0.20	0.01	5.76	1.74	0.02	5.88	1.62	0.03	3.09	1.40	0.03	2.89	1.57	0.03
16.00	0.18	0.01	6.16	1.70	0.02	6.28	1.58	0.03	3.50	1.49	0.04	3.29	1.73	0.03
16.99	0.15	0.01	6.56	1.61	0.02	6.67	1.48	0.03	3.90	1.63	0.04	3.70	1.82	0.04
17.99	0.12	0.01	6.96	1.47	0.02	7.07	1.37	0.02	4.30	1.71	0.04	4.10	1.83	0.04
18.99	0.11	0.01	7.37	1.36	0.02	7.47	1.23	0.02	4.70	1.73	0.04	4.50	1.81	0.04
19.99	0.10	0.01	7.77	1.24	0.02	7.86	1.09	0.02	5.11	1.71	0.04	4.90	1.65	0.03
20.99	0.07	0.01	8.17	1.12	0.02	8.26	1.00	0.02	5.51	1.60	0.04	5.31	1.62	0.03
21.99	0.06	0.00	8.57	1.06	0.02	8.66	0.89	0.02	5.91	1.50	0.04	5.71	1.47	0.03
22.98	0.05	0.00	8.98	0.94	0.02	9.06	0.80	0.02	6.31	1.38	0.03	6.11	1.30	0.03
23.98	0.05	0.00	9.38	0.80	0.02	9.45	0.70	0.02	6.72	1.24	0.03	6.51	1.14	0.03
24.98	0.05	0.00	9.78	0.70	0.02	10.15	0.56	0.01	7.12	1.14	0.03	6.92	1.00	0.03
25.98	0.031	0.003	10.48	0.632	0.009	11.14	0.427	0.009	7.52	1.001	0.030	7.32	0.873	0.025
26.98	0.032	0.003	11.49	0.464	0.008	12.13	0.328	0.008	7.92	0.918	0.028	7.72	0.803	0.024
27.97	0.033	0.003	12.49	0.364	0.007	13.12	0.289	0.007	8.33	0.828	0.027	8.12	0.695	0.022
28.97	0.024	0.003	13.50	0.319	0.006	14.12	0.201	0.006	8.73	0.699	0.025	8.52	0.582	0.020
29.97	0.029	0.003	14.51	0.225	0.005	15.11	0.153	0.005	9.13	0.647	0.024	8.93	0.524	0.019
30.97	0.023	0.003	15.51	0.170	0.005	16.10	0.119	0.005	9.53	0.556	0.022	9.33	0.476	0.018
31.97	0.020	0.003	16.52	0.132	0.004	17.09	0.097	0.004	10.24	0.448	0.012	9.73	0.394	0.017
32.97	0.019	0.003	17.52	0.111	0.004	18.09	0.083	0.004	11.24	0.347	0.011	10.44	0.320	0.009
33.96	0.019	0.003	18.53	0.095	0.004	19.08	0.066	0.003	12.25	0.278	0.010	11.44	0.244	0.008
34.96	0.016	0.002	19.53	0.074	0.003	20.07	0.056	0.003	13.26	0.179	0.008	12.45	0.190	0.007
35.96	0.016	0.002	20.54	0.060	0.003	21.06	0.053	0.003	14.26	0.155	0.007	13.45	0.128	0.006
36.96	0.009	0.002	21.55	0.054	0.003	22.06	0.042	0.003	15.27	0.106	0.006	14.46	0.088	0.005
37.96	0.011	0.002	22.55	0.045	0.002	23.05	0.030	0.002	16.28	0.089	0.006	15.46	0.064	0.004
38.95	0.007	0.002	23.56	0.039	0.002	24.04	0.030	0.002	17.28	0.072	0.005	16.47	0.056	0.004
39.95	0.009	0.002	24.56	0.036	0.002	25.03	0.026	0.002	18.29	0.059	0.005	17.48	0.044	0.003
40.95	0.005	0.001	25.57	0.030	0.002	26.03	0.025	0.002	19.29	0.048	0.004	18.48	0.034	0.003
41.95	0.005	0.001	26.57	0.028	0.002	27.02	0.021	0.002	20.30	0.036	0.004	19.49	0.029	0.003
42.95	0.004	0.001	27.58	0.024	0.002	28.01	0.017	0.002	21.31	0.040	0.004	20.49	0.023	0.003
43.95	0.003	0.001	28.58	0.024	0.002	29.00	0.018	0.002	22.31	0.024	0.003	21.50	0.017	0.002
44.94	0.003	0.001	29.59	0.021	0.002	30.00	0.014	0.002	23.32	0.024	0.003	22.51	0.015	0.002
45.94	0.002	0.001	30.60	0.020	0.002	30.99	0.013	0.001	24.33	0.020	0.003	23.51	0.009	0.002
46.94	0.002	0.001	31.60	0.016	0.001	31.98	0.011	0.001	25.33	0.011	0.002	24.52	0.009	0.002
47.94	0.002	0.001	32.61	0.015	0.001	32.97	0.009	0.001	26.34	0.014	0.002	25.52	0.010	0.002
48.94	0.0	0.0	33.61	0.013	0.001	33.96	0.007	0.001	27.34	0.019	0.003	26.53	0.006	0.001
49.93	0.0	0.0	34.62	0.014	0.001	34.96	0.008	0.001	28.35	0.011	0.002	27.53	0.007	0.001
50.93	0.001	0.001	35.62	0.012	0.001	35.95	0.009	0.001	29.36	0.011	0.002	28.54	0.006	0.001
51.93	0.0	0.0	36.63	0.005	0.001	36.94	0.005	0.001	30.36	0.012	0.002	29.55	0.003	0.001
52.93	0.0	0.0	37.64	0.008	0.001	37.93	0.007	0.001	31.37	0.006	0.001	30.55	0.003	0.001
53.93	0.0	0.0	38.64	0.007	0.001	38.93	0.003	0.001	32.38	0.007	0.002	31.56	0.001	0.000
54.93	0.0	0.0	39.65	0.003	0.001	39.92	0.003	0.001	33.38	0.005	0.001	32.56	0.003	0.001
55.62	0.0	0.0	40.65	0.004	0.001	40.91	0.003	0.001	34.39	0.006	0.001	33.57	0.001	0.001
0.0	0.0	0.0	41.66	0.004	0.001	41.90	0.003	0.001	35.39	0.006	0.001	34.58	0.002	0.001
0.0	0.0	0.0	42.66	0.004	0.001	42.90	0.002	0.001	36.40	0.001	0.001	35.58	0.001	0.001
0.0	0.0	0.0	43.67	0.002	0.001	43.89	0.001	0.000	37.41	0.005	0.001	36.59	0.001	0.000
0.0	0.0	0.0	44.67	0.002	0.000	44.88	0.001	0.000	38.41	0.004	0.001	37.59	0.001	0.000
0.0	0.0	0.0	45.68	0.001	0.000	45.87	0.000	0.000	39.42	0.001	0.001	38.60	0.001	0.000
0.0	0.0	0.0	46.69	0.001	0.000	46.69	0.0	0.0	40.43	0.002	0.001	39.60	0.000	0.000
0.0	0.0	0.0	47.59	0.000	0.000	0.0	0.0	0.0	41.43	0.001	0.001	40.61	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.44	0.001	0.001	41.62	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.44	0.001	0.001	42.62	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.45	0.0	0.0	43.63	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.46	0.0	0.0	44.63	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.46	0.0	0.0	45.64	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.47	0.000	0.000	46.65	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.48	0.0	0.0	47.65	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.48	0.0	0.0	48.66	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.49	0.0	0.0	49.66	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.49	0.0	0.0	50.24	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.50	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.03	0.0	0.0	0.0	0.0	0.0

TABLE 20 (cont.)

ALPHA FROM A = 27 BOMBARDED BY 62 MEV. PROTONS.

135 DEG - RUN 2065			160 DEG - RUN 2066											
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR
3.57	2.25	0.12	3.60	1.85	0.07									
3.97	1.94	0.11	4.01	1.78	0.07									
4.37	1.86	0.11	4.41	1.71	0.07									
4.77	1.88	0.11	4.82	1.62	0.07									
5.17	1.59	0.10	5.23	1.36	0.06									
5.57	1.39	0.09	5.64	1.14	0.06									
5.97	1.33	0.09	6.05	0.98	0.05									
6.37	1.04	0.08	6.45	0.88	0.05									
6.77	0.95	0.07	6.86	0.76	0.05									
7.17	0.82	0.07	7.27	0.64	0.04									
7.57	0.76	0.07	7.68	0.56	0.04									
7.97	0.63	0.06	8.09	0.46	0.04									
8.37	0.57	0.06	8.49	0.34	0.03									
8.77	0.44	0.05	8.90	0.26	0.03									
9.17	0.45	0.05	9.31	0.27	0.03									
9.57	0.39	0.05	9.72	0.24	0.03									
10.27	0.286	0.026	10.43	0.183	0.014									
11.27	0.224	0.023	11.45	0.125	0.012									
12.27	0.200	0.022	12.47	0.089	0.010									
13.27	0.139	0.018	13.49	0.086	0.010									
14.27	0.099	0.015	14.52	0.059	0.008									
15.27	0.043	0.010	15.54	0.043	0.007									
16.27	0.061	0.012	16.56	0.027	0.006									
17.27	0.027	0.008	17.58	0.024	0.005									
18.27	0.034	0.009	18.60	0.012	0.004									
19.27	0.026	0.008	19.62	0.019	0.005									
20.27	0.016	0.006	20.64	0.014	0.004									
21.27	0.016	0.006	21.66	0.007	0.003									
22.27	0.006	0.004	22.68	0.005	0.002									
23.27	0.007	0.004	23.70	0.006	0.003									
24.27	0.015	0.006	24.72	0.004	0.002									
25.27	0.005	0.003	25.74	0.005	0.002									
26.27	0.002	0.002	26.76	0.003	0.002									
27.27	0.002	0.002	27.78	0.0	0.0									
28.27	0.002	0.002	28.80	0.002	0.002									
29.27	0.0	0.0	29.82	0.001	0.001									
30.27	0.005	0.003	30.84	0.0	0.0									
31.27	0.0	0.0	31.86	0.001	0.001									
32.27	0.0	0.0	32.88	0.0	0.0									
33.27	0.005	0.003	33.90	0.0	0.0									
34.27	0.002	0.002	34.92	0.0	0.0									
35.27	0.0	0.0	35.94	0.0	0.0									
36.27	0.0	0.0	36.96	0.0	0.0									
37.27	0.0	0.0	37.98	0.0	0.0									
38.27	0.0	0.0	39.00	0.0	0.0									
39.27	0.0	0.0	40.03	0.0	0.0									
40.27	0.0	0.0	41.05	0.0	0.0									
41.27	0.0	0.0	42.07	0.0	0.0									
42.27	0.0	0.0	43.09	0.0	0.0									
43.27	0.0	0.0	44.11	0.0	0.0									
44.27	0.0	0.0	45.13	0.0	0.0									
45.27	0.0	0.0	46.15	0.0	0.0									
46.27	0.0	0.0	46.73	0.0	0.0									
47.15	0.0	0.0	0.0	0.0	0.0									

PROTON FROM A = 27 BOMBARDED BY 29 MEV. PROTONS.

11 DEG - RUN 33			30 DEG - RUN 26			60 DEG - RUN 34							
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)
2.03	6.35	0.49	1.99	6.45	0.19	1.79	5.54	0.11					
2.44	8.18	0.55	2.39	8.00	0.21	2.19	6.57	0.13					
2.84	8.78	0.57	2.79	8.77	0.22	2.59	7.34	0.13					
3.24	11.15	0.64	3.19	9.96	0.23	2.99	8.33	0.14					
3.64	11.87	0.66	3.59	8.62	0.22	3.39	7.79	0.14					
4.04	11.99	0.67	4.00	8.09	0.21	3.80	7.09	0.13					
4.45	10.80	0.63	4.40	7.65	0.20	4.20	6.58	0.13					
4.85	9.34	0.59	4.80	7.38	0.20	4.60	6.07	0.12					
5.25	10.63	0.63	5.20	7.07	0.20	5.00	5.72	0.12					
5.65	10.95	0.64	5.61	6.02	0.18	5.41	5.27	0.11					
6.05	10.79	0.63	6.01	5.93	0.18	5.81	4.94	0.11					
6.45	9.91	0.61	6.41	5.85	0.18	6.21	4.41	0.10					
7.16	10.07	0.39	7.11	5.06	0.11	6.61	4.13	0.10					
8.16	9.02	0.37	8.12	4.29	0.10	7.32	3.68	0.06					
9.17	7.63	0.34	9.13	3.37	0.09	8.32	3.12	0.05					
10.17	8.87	0.36	10.13	3.39	0.09	9.33	2.23	0.05					
11.18	8.08	0.35	11.14	2.80	0.08	10.33	2.22	0.05					
12.18	7.62	0.34	12.14	2.63	0.08	11.34	1.89	0.04					
13.19	7.53	0.33	13.15	2.49	0.07	12.35	1.62	0.04					
14.19	6.95	0.32	14.15	2.15	0.07	13.35	1.39	0.04					
15.19	6.56	0.31	15.16	2.03	0.07	14.36	1.23	0.03					
16.20	6.55	0.31	16.16	2.20	0.07	15.36	1.18	0.03					
17.20	6.93	0.32	17.17	2.29	0.07	16.37	1.09	0.03					
18.21	6.35	0.31	18.18	2.20	0.07	17.38	1.27	0.03					
19.21	5.74	0.29	19.18	1.90	0.06	18.38	0.95	0.03					
20.22	5.38	0.28	20.19	1.94	0.07	19.39	1.15	0.03					
21.22	6.75	0.32	21.19	3.06	0.08	20.39	1.55	0.04					
22.23	5.12	0.28	22.20	1.47	0.06	21.40	0.78	0.03					
23.23	4.990	0.273	23.20	1.536	0.058	22.40	0.633	0.025					
24.24	4.49	0.26	24.21	1.55	0.06	23.41	0.80	0.03					
25.24	7.41	0.33	25.21	4.76	0.10	24.42	1.24	0.03					
26.25	19.65	0.54	26.22	4.69	0.10	25.42	1.32	0.04					
27.25	4.23	0.25	27.23	2.79	0.08	26.43	0.75	0.03					
27.98	17.34	0.76	27.80	2.10	0.18	27.06	0.68	0.05					

TABLE 21

DEUTERON FROM A = 27 BOMBARDED BY 29 MEV. PROTONS.

11 DEG - RUN 33			30 DEG - RUN 26			60 DEG - RUN 34							
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA ERROR (MB/SR-MEV)
4.39	0.476	0.133	1.89	0.108	0.024	1.68	0.063	0.012					
4.80	0.487	0.135	2.29	0.161	0.030	2.09	0.097	0.015					
5.20	0.543	0.142	2.69	0.189	0.032	2.49	0.200	0.022					
5.60	0.410	0.124	3.09	0.330	0.043	2.89	0.253	0.025					
6.00	0.86	0.18	3.49	0.37	0.05	3.29	0.28	0.03					
6.40	0.43	0.13	3.90	0.47	0.05	3.70	0.29	0.03					
7.11	0.58	0.09	4.30	0.53	0.05	4.10	0.42	0.03					
8.11	0.63	0.10	4.70	0.43	0.05	4.50	0.34	0.03					
9.12	0.56	0.09	5.10	0.49	0.05	4.90	0.35	0.03					
10.12	0.55	0.09	5.51	0.44	0.05	5.31	0.33	0.03					
11.13	0.46	0.08	5.91	0.46	0.05	5.71	0.33	0.03					
12.13	0.42	0.08	6.31	0.45	0.05	6.11	0.31	0.03					
13.13	1.80	0.16	6.71	0.45	0.05	6.51	0.31	0.03					
14.14	1.490	0.149	7.42	0.385	0.029	7.22	0.304	0.017					
15.14	0.926	0.117	8.42	0.379	0.029	8.22	0.259	0.016					
16.15	1.214	0.134	9.43	0.464	0.032	9.23	0.324	0.018					
17.15	2.244	0.183	10.43	0.465	0.032	10.23	0.218	0.014					
18.16	2.237	0.183	11.44	0.413	0.030	11.24	0.278	0.016					
18.81	0.0	0.0	12.44	0.832	0.043	12.25	0.274	0.016					
0.0	0.0	0.0	13.45	0.917	0.045	13.25	0.246	0.015					
0.0	0.0	0.0	14.45	0.535	0.034	14.26	0.303	0.017					
0.0	0.0	0.0	15.46	1.566	0.059	15.26	0.145	0.012					
0.0	0.0	0.0	16.47	0.502	0.033	16.27	0.487	0.022					
0.0	0.0	0.0	17.47	2.318	0.071	17.27	0.027	0.005					
0.0	0.0	0.0	18.33	0.006	0.004	0.0	0.0	0.0					

TABLE 22

TABLE 23

TRITON FROM A = 27 BOMBARDED BY 29 MEV. PROTONS.

11 DEG - RUN 33			30 DEG - RUN 26			60 DEG - RUN 34							
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)
6.40	0.237	0.094	6.41	0.052	0.017	6.41	0.031	0.009					
7.11	0.085	0.036	7.11	0.049	0.010	7.12	0.017	0.004					
8.11	0.030	0.021	8.12	0.054	0.011	8.12	0.031	0.005					
9.12	0.015	0.015	9.13	0.046	0.010	9.13	0.011	0.003					
10.12	0.074	0.033	10.13	0.039	0.009	10.13	0.045	0.007					
11.13	0.149	0.047	11.14	0.093	0.014	11.14	0.198	0.014					
12.13	0.531	0.089	12.14	0.501	0.033	11.82	0.003	0.003					
13.13	0.080	0.034	13.07	0.0	0.0	0.0	0.0	0.0					
13.74	0.074	0.074	0.0	0.0	0.0	0.0	0.0	0.0					

TABLE 24

HELIUM-3 FROM A = 27 BOMBARDED BY 29 MEV. PROTONS.

11 DEG - RUN 33			30 DEG - RUN 26			60 DEG - RUN 34							
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA ERROR (MB/SR-MEV)
6.86	0.0	0.0	6.86	0.0	0.0	6.86	0.0	0.0					
7.26	0.0	0.0	7.27	0.0	0.0	7.27	0.024	0.008					
7.66	0.0	0.0	7.67	0.0	0.0	7.67	0.044	0.010					
8.06	0.0	0.0	8.07	0.0	0.0	8.07	0.022	0.007					
8.46	0.0	0.0	8.47	0.0	0.0	8.47	0.035	0.009					
8.87	0.0	0.0	8.87	0.0	0.0	8.88	0.0	0.0					
9.27	0.0	0.0	9.28	0.0	0.0	9.28	0.0	0.0					
9.67	0.0	0.0	9.68	0.0	0.0	9.68	0.0	0.0					
10.37	0.010	0.012	10.38	0.006	0.004	10.38	0.0	0.0					
11.38	0.104	0.039	11.39	0.032	0.008	11.39	0.0	0.0					
12.38	0.140	0.046	12.39	0.033	0.008	12.40	0.015	0.004					
13.39	0.060	0.030	13.40	0.037	0.009	12.95	0.015	0.012					
14.39	0.040	0.024	14.41	0.045	0.010	0.0	0.015	0.0					
15.40	0.169	0.050	15.41	0.031	0.008	0.0	0.0	0.0					
16.40	0.129	0.044	16.42	0.116	0.016	0.0	0.0	0.0					
17.40	0.049	0.027	17.30	0.0	0.0	0.0	0.0	0.0					
17.96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					

ALPHA FROM A = 27 BOMBARDED BY 29 MEV. PROTONS.

11 DEG - RUN 33			30 DEG - RUN 26			60 DEG - RUN 34							
ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA (MB/SR-MEV)	ERROR	ENERGY (MEV)	SIGMA ERROR (MB/SR-MEV)
2.69	0.88	0.18	2.69	0.51	0.05	2.69	0.64	0.04					
3.09	1.23	0.21	3.09	0.69	0.06	3.09	0.85	0.05					
3.49	1.27	0.22	3.49	0.90	0.07	3.50	1.17	0.05					
3.89	1.49	0.24	3.90	1.31	0.08	3.90	1.62	0.06					
4.29	2.08	0.28	4.30	1.76	0.10	4.30	2.01	0.07					
4.70	2.59	0.31	4.70	2.13	0.11	4.70	2.30	0.07					
5.10	2.76	0.32	5.10	2.43	0.12	5.10	2.41	0.08					
5.50	2.88	0.33	5.51	2.70	0.12	5.51	2.44	0.08					
5.90	2.91	0.33	5.91	2.96	0.13	5.91	2.49	0.08					
6.30	3.47	0.36	6.31	3.27	0.13	6.31	2.44	0.08					
6.71	3.96	0.38	6.71	3.25	0.13	6.71	2.20	0.07					
7.11	3.20	0.35	7.11	2.96	0.13	7.12	2.09	0.07					
7.51	2.38	0.30	7.52	3.28	0.13	7.52	1.87	0.07					
7.91	3.02	0.34	7.92	3.31	0.13	7.92	1.76	0.06					
8.31	3.00	0.33	8.32	2.67	0.12	8.32	1.55	0.06					
8.71	2.54	0.31	8.72	2.47	0.12	8.73	1.34	0.06					
9.12	2.80	0.32	9.13	2.17	0.11	9.13	1.26	0.05					
9.52	2.72	0.32	9.53	1.96	0.10	9.53	1.10	0.05					
10.22	2.23	0.18	10.23	1.58	0.06	10.23	0.91	0.03					
11.23	1.441	0.147	11.24	1.266	0.053	11.24	0.622	0.024					
12.23	1.339	0.141	12.24	0.938	0.045	12.25	0.481	0.021					
13.24	0.812	0.110	13.25	0.626	0.037	13.25	0.306	0.017					
14.24	0.628	0.097	14.25	0.507	0.033	14.26	0.221	0.015					
15.24	0.467	0.083	15.26	0.389	0.029	15.26	0.213	0.014					
16.25	0.346	0.072	16.26	0.312	0.026	16.27	0.165	0.013					
17.25	0.458	0.083	17.27	0.200	0.021	17.27	0.155	0.012					
18.26	0.360	0.073	18.28	0.325	0.027	18.28	0.104	0.010					
19.26	0.316	0.069	19.28	0.189	0.020	19.29	0.063	0.008					
20.27	0.273	0.064	20.29	0.184	0.020	20.29	0.045	0.007					
21.27	0.149	0.047	21.29	0.163	0.019	21.30	0.004	0.002					
22.28	0.060	0.030	22.30	0.001	0.002	22.30	0.005	0.002					
23.28	0.045	0.026	23.30	0.014	0.006	23.31	0.029	0.005					
24.29	0.0	0.0	24.31	0.059	0.011	24.32	0.001	0.001					
25.29	0.045	0.026	25.31	0.0	0.0	25.32	0.012	0.003					
26.29	0.0	0.0	26.32	0.002	0.002	26.33	0.006	0.002					
27.30	0.075	0.033	27.33	0.072	0.013	27.33	0.008	0.003					
28.30	0.059	0.030	28.33	0.026	0.008	27.91	0.0	0.0					
29.31	0.0	0.0	29.24	0.0	0.0	0.0	0.0	0.0					
29.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					

TABLE 25

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